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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

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ar December 27, 1972 / January 3, 1973 Vol. VI, No. 52 / Vol. VII, No. 1

Conference attendance and exhibitor participation were up.

CW Photos by E. Drake Lundell Jr.

Cleanup was part of Agnes' legacy.

NEWSPAPER

Inside, Outside DP Center Users Had an Active Year

By Edward J. Bride
Of the CW Staff

Courtrooms. Natural disaster. Privacy. Performance . . .

Inside and outside the DP center the computer community had a busy year – especially when the computers were not in operation.

And when they were, issues ranging from patents to privacy to performance evaluation concerned users.

With more and more experts proclaiming an end to the recession, new products became the order of the day.

Year-end review begins on page 17.

Most of the new hardware embodied enhancements to current systems or new units in existing families of mainframes. Data entry and communications equipment was particularly prominent.

In software, the main growth was in performance evaluation and optimization packages. Interest in this area was evident throughout the year, as computer societies examined the various methods used to measure performance.

This interest was most prominent at the Fall Joint Computer Conference; one of seven divisions in the FJCC technical program was devoted to measurement, and the sessions in that division were particularly well-attended.

Privacy became more of an international issue in 1972, with at least four high-level committees studying the issue. Three of those groups – one each in the U.S., England and Canada – concluded that computer usage has not wrought the invasion of privacy feared by many civil libertarians.

The committees called for measures, including legislation, to protect privacy, and the U.S. advisory committee to the Secretary of Health, Education and Welfare is expected to reach parallel findings – perhaps somewhat more specific in its recommendations – early in 1973.

And Then Came Agnes

There was a real calamity for users in 1972 – the June floods caused by hurricane-turned-tropical storm Agnes. Hundreds of installations were temporarily wiped out by record rainfalls, and users learned, some too late, that DP centers in low-lying areas should be moved to higher floors.

Whatever action is to be taken, the floods demonstrated the futility of standing to fight the elements, even after physical security and data security measures pass inspection.

Late in the year, the Supreme Court overturned a software patent, and users and lawyers are still unsure of the ramifications of that decision [see story on page 20].

Some sources suggested that, without adequate protection, the software industry might not pursue product improvements so energetically, while legal sources said the decision only proved the failings of patents as protection for software.

Notice to Subscribers

This is Computerworld's special combined year-end review issue dated Dec. 27/Jan. 3. The next issue will be dated Jan. 10 and should reach subscribers by that date.

Court Documents Uncovered

IBM Memos Said to Give Glimpse of Price Strategy

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK—An internal IBM memo states that an "intensive investigation" of IBM's pricing policies "would reveal the extent of our price control and its supporting practices" in the computer market.

"Such a revelation would not be helpful to our monopoly defense," the memo added.

The document is one of three that have been recently uncovered among the almost 27 million documents filed in the various antitrust cases against the company.

The first memo, dated 1969 and initialed HAF, and found in the files of R. A. Pfeiffer, stated that "the liability of IBM's risk lease is dependent on price leadership and price control."

The memorandum, recently unveiled by the Computer Industry Association which has been poring over the court documents, was probably written by Hillary Faw, who was IBM director of business practices at the time, according to the U.S. Justice Department in introducing the document in its particular case.

"By means of price leadership," the memo continued, "IBM has established the value of data processing usage.

"IBM then maintains or controls that value by various means: timing of new technology insertion; functional pricing; coordinated management of delivery; support services and inventory; refusal to market surplus used equipment; refusal to discount for age or for quantity; strategic location of function in boxes; solution selling rather than hardware selling; refusal to support subsequent use hardware, etc."

The memo, which IBM unsuccessfully sought to keep barred from the record in the case, added that "functional pricing [is] already under pressure from OEM activity. Unbundling will increase that pressure."

The memo also noted that "legal problems are emerging as a result of certain practices which are key underpinnings to price control." The practices are then identified as: "refusal to market used machines and parts," "refusal to sell bills of material" and "maintenance parts prices."

The document stated that "our price control has been sufficiently absolute to render unnecessary direct management involvement in the means . . . ," with the next five lines deleted.

The memo also said that the Department of Justice complaint "specifically covers varying profit margins and an intensive investigation of this issue would reveal the extent of our price control and its supporting practices. Such a revelation would not be helpful to our monopoly defense.

"If IBM's price control is seriously threatened," the memo continued, "either from the market (because of unbundling) or from legal exposure (because of the supporting practices) or from the D.J. [Department of Justice] (because of demands for remedy), it is necessary that IBM management fully understand its import" in order to determine the firm's future strategy vis-à-vis the government's antitrust suit.

The memorandum recommended that IBM "assemble a small, knowledgeable, secure group to think through these issues, particularly in their interrelationships, define the emerging environment and the various new forces which indicate significant new change and map the rudimentary elements of strategy or alternative strategies for consideration by management."

The second document deals with how

(Continued on Page 2)

Comments Wanted

Handprint Guide Proposed

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – The American National Standards Institute (Ansi) has just released a proposed character set for handprinting and the public has the next three-and-a-half months to comment on the proposal before it is voted on.

The standard provides the shapes and sizes of handprinted characters to be used in optical character recognition systems, and the same shapes (without delimiting sizes) of characters to be used in man-to-man communications.

Avoid Ambiguity

The purpose in providing such a standard for man-to-man usage, the draft noted, is to enable unambiguous communication between people "when the accuracy of the communication is more important than the speed and flexibility usually associated with the written mode of communication." Its use, then, is seen as somewhat awkward, but accurate in the meaning of each character printed.

Two factors were considered especially important in order to avoid a standard that would be subject to frequent modification – the desirability of including characters for a broad range of applications, and consideration of international standards, an X3A1 committee spokesman said. Beyond that, special consideration was given to "human factors" and the current state of OCR technology, he added.

To ensure long-term stability, parts of the standard are ahead of their time. Some characters are included which, at the time of development of the standard, are not handled by OCR machines available to the public.

The standard actually proposes four

(Continued on Page 2)

Citizens' Committee Formed to Oversee Crime Net Privacy

BOSTON – "One of the first if not the first" citizens' review-type panels to oversee privacy considerations in police information systems was sworn in here last week by Gov. Frances W. Sargent.

The Massachusetts Privacy and Security Council, made up of lawyers and "interested citizens," as opposed to users of computer-based criminal justice systems, will first consider whether the state's police agencies should tie into the FBI's Computerized Criminal History System.

In swearing in the new body, Sargent noted: "We have got to be concerned about privacy of individuals. On the one hand we want to be able to compile data, but on the other hand we must protect the individual's rights."

On the Inside This Week

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Ansi Proposes Handprint Standard

(Continued from Page 1)

interrelated character sets. The numeric subset includes each of the digits 0 through 9, the character "X" and techniques for "erasing" single characters or groups of them. Erasing in fact entails crossing out the character or characters so the shape(s) cannot be recognized.

The alphanumeric subset includes the digits, all the alphabetic characters and various punctuation marks, as well as the erasing techniques. The alpha characters are in upper-case form only in the draft standard.

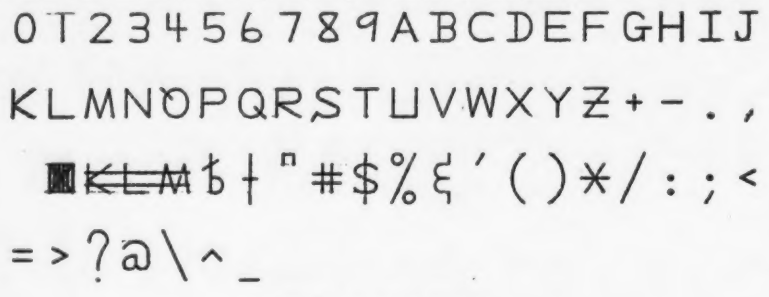
A programming subset adds more special characters to the ones that make up the alphanumeric set. The additional symbols are those required for commonly used programming languages "other than those normally programmed in a 'conversational' mode," the draft said, noting these shapes were added to facilitate use of OCR equipment for program development.

International Needs Considered

Finally, a universal subset adds a range of accented characters and symbols appropriate to the international user needs, including the British pound and Japanese yen symbols. The standard permits intermixed use of the plain and flagged "1," and the plain and barred "7."

The specifications are deliberately written in a somewhat loose and incomplete, precise manner, the draft noted, since the main idea is to achieve a reasonable degree of control "without imposing unduly on the skill or patience" of the person doing the printing. The characters should be reasonably neat "but not necessarily of a quality one would expect of a draftsman," the booklet continued.

Copies of the draft may be requested from, and comments on the proposal addressed to the X3 secretariat, at the Computer and Business Equipment Manufacturers Association (Cbema), 1828 L St., N.W., 20036.



Programming Subset

Canadians Act, Too

REXDALE, Ontario – A working group within the Canadian Standards Association was organized recently to study and recommend a standard for handprint for OCR application. Chairman of the group Dean F. Noble of Recognition Equipment Canada Ltd. said he is aware of the proposed Ansi standard, and feels in general it would serve Canadians adequately, though some changes might be needed to reflect the strong French influence in this country.

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Memo Said to Reveal IBM Strategy

(Continued from Page 1)

IBM prices new systems in order to maximize profit, and was dated April 20, 1970, and sent from T. V. Learson to P. J. Rizzo.

In it Learson noted that the planned prices on the NS2, which later became the 370 line, looked for "a profit at 48 months of some 35%-38% on memory with a profit of 25% on the CPU.

"I am told," Learson said, "that the memory represents one-third of the revenue of this combination and the CPU two-thirds. At the above profit level for memories, they estimate they will be 30% above competition in price.

"Originally, I advised them to price memories and CPUs both at 30%. They readily agree that CPUs cannot be easily duplicated whereas memories can be easily duplicated on a plug-in basis.

"I would, therefore, conclude that we should have a 25% profit on memories, higher price on CPUs and end up with an overall profit in the 32% range."

The Computer Industry Association noted upon releasing the document that a scheme at least similar to the one proposed by Learson was adopted when the firm announced the 370 line, resulting in increased prices to users and harder competition for the independent memory producers.

'Confidential' Document

The third document to come to light as a result of recent filings in the various suits against IBM concerns the strategy of lease versus purchase in the computer equipment marketplace, the Computer Industry Association said.

The memo, which is marked "Strictly Confidential" and "Please Destroy When Finished," was sent from T. C. Papes to F. T. Cary, J. R. Opel and D. M. Piccone.

It stated that "a predominant lease market places the greatest financial strain on the competing equipment manufacturers."

An argument against allowing increased purchases of IBM equipment, according to Papes, is that "it is probably that increases in the purchase level have the effect of decreasing the average rental life of the system being purchased," adding that "it is probable that purchase customers grow more slowly than lease customers."

In addition, the memo stated: "It is probable that the vast majority of points purchased by leasing companies will remain on rental for a period sufficient to represent a significant loss of profits by IBM from a total-program point of view."

DP Sweetens Sugar Production

SYDNEY, Australia – Research scientists in the sugar industry are using a mobile computer to apply modern control theory to the production of raw sugar.

Computer control of the crystallization stage has been shown to be practical and the researchers will spend the rest of the current crushing season finding the most suitable values for the variables on which good quality sugar depends.

In the production of raw sugar, the sugar cane is crushed to separate the bagasse (cane fiber) from the juice which is then clarified with lime to remove most of the impurities. The clarified juice passes through a series of evaporators where it is boiled under vacuum to form a syrup containing about 65% sugar. The syrup is next boiled in a vacuum pan until sugar crystals are produced.

Control studies were carried out in the Division of Chemical Engineering by Dr. R. Batterham and Dr. J. Frew. Frew developed a set of operating policies which would allow the greatest possible throughput from the vacuum pan by minimizing the time taken for a 'strike.' (A strike is the crystallization process in the vacuum pan from the time the syrup is admitted until sufficient sugar crystals have been formed.)

Small Grains

The essential objective of the researchers was to operate the pan to produce crystals of a given size in a reasonable time with as few as possible very small grains.

The crystal content of the pan cannot be allowed to become too high since it will interfere with the circulation of the syrup mixture. The most important factor affecting efficient operation is the degree of supersaturation of the pan.

Information on material inflow and outflow is fed into the computer along with various basic measurements such as temperature, pressure, conductivity and change in boiling point. This provides information on the amounts of crystal, water impurities and dissolved sucrose, all of which affect supersaturation.

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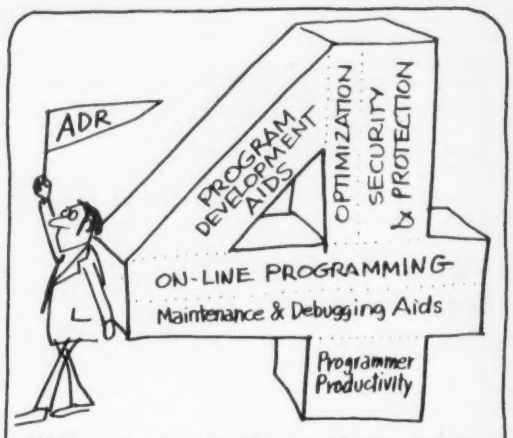

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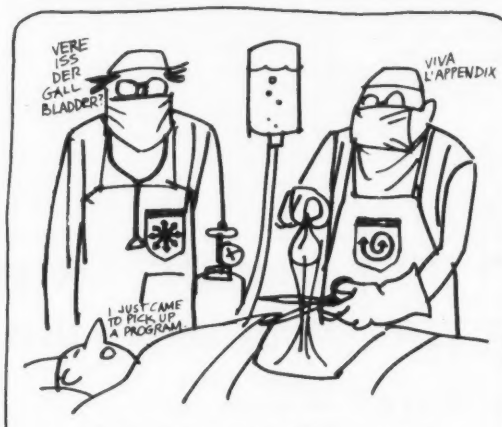

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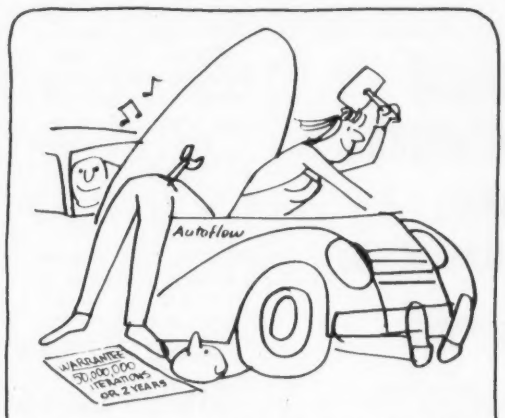

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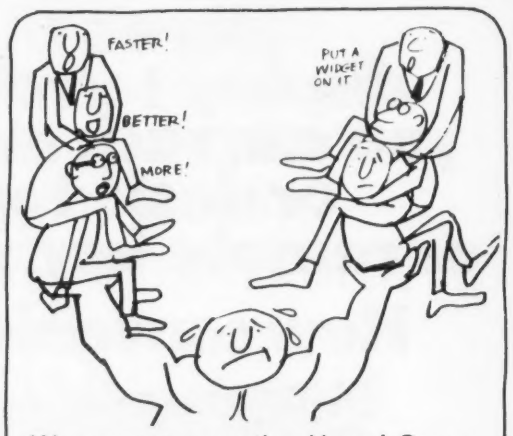

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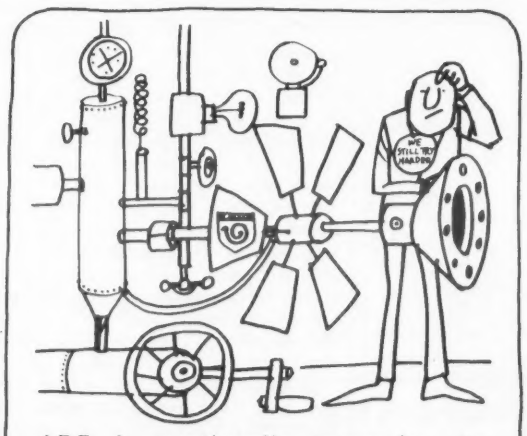

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Child Abuse Data Bank Proposed

HAUPPAUGE, N.Y. – A resolution to establish a computerized system to detect child abuse cases has been proposed to the County Legislature here.

If passed, the resolution would require doctors and other medical personnel to report all children's wounds that require medical assistance, in addition to clearly established cases of abuse or neglect, according to Martin Feldman, author of the resolution. Reports would be made to a central computer, probably operated by police.

Feldman said if more than one case

News Wrapup

involving the same child appeared in one year, a social service inspector would be sent to investigate. If investigation indicated the child had been abused, court action would begin.

Feldman claimed parents often avoid detection by taking their children to different doctors and hospitals, but his system would solve that problem.

At present doctors are required to report suspected cases of child abuse but few cases are ever reported.

Dr. Milton Rosenberg, president of the Suffolk County Medical Society, said doctors face a breach of confidentiality if they report a case that turns out not to be child abuse.

The resolution was expected to come before the legislature for a vote on Dec. 26.

East-West 'Think Tank' To Begin in January

VIENNA, Austria – The International Institute of Applied Systems Analysis, an East-West computer "think tank," is slated to open near here in January.

The institute, formed by the U.S. National Academy of Sciences, the Soviet Academy of Sciences and similar scientific bodies in 10 other countries, is seen as a way of using systems analysis to solve the global problems of the industrial age, according to George Bundy, father of the project.

The center, located in a renovated 18th century palace, will be a pioneer linking of Eastern and Western computer technologies, according to an Austrian Foreign Ministry official.

The project is expected to employ about 100 scientists and the first research project will probably center on the world's energy resources.

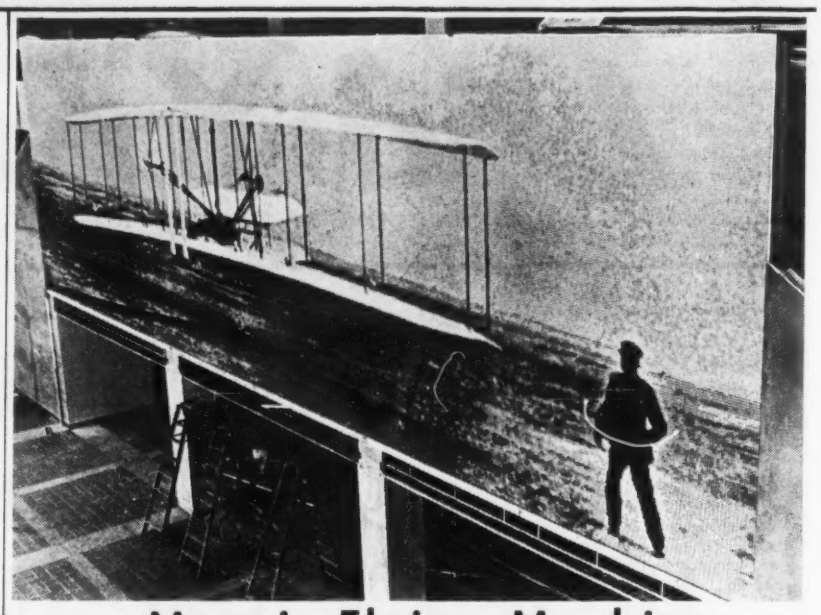
Other areas to be studied include water resources, pollution, agricultural production and earthquake and flood prediction.

Board Recommends Study Of Non-Moving Accidents

WASHINGTON, D.C. – The National Transportation Board has recommended that the Department of Transportation consider interagency negotiations with the Department of Health, Education and Welfare for use of HEW's National Electronic Injury Surveillance System to provide computer-collected information on non-operating motor vehicle accidents and injuries.

Non-operating accidents are those which occur when the vehicles are not moving. For example, sharp trunk lids can be safety hazards, or closing a car door on a person's hand. One measure that can prevent the latter is to put foam between the door and the frame of the car, a board official explained.

The board noted that a "large number" of disabling injuries result from non-moving motor vehicle accidents. It also urged the National Highway Traffic Safety Administration to initiate a study to identify nonoperating hazards and publish consumer information to eliminate or reduce such hazards.



Mosaic Flying Machine

Computer techniques played an important role in the creation of this 60 ft by 20 ft mosaic commemorating the first flight by the Wright Brothers on Dec. 17, 1903. Scientists with Mead Technology Laboratories used advanced photographic analysis techniques and computer-based graphics to determine the placement of the 163,000 one-inch-square tiles that make up the mosaic. Using an ink jet printing process, the firm produced a 25% scale printout of the full work. The print was sent to Italy where the tiles were produced and assembled in 12 in. by 12 in. sheets. In order to assure exact placement of each tile, they were given an identification number by the computer system.

State Still Debates Software Tax

Special to Computerworld

SAN DIEGO – The issue of whether software in California should be taxed as tangible, personal property was reopened here at a special hearing held by the State Assembly Committee on Revenue and Taxation.

The committee, headed by Assemblyman Joseph A. Gonsalves (D-Alhambra), heard testimony from representatives of the software industry, the Western Electronics Manufacturers Association, (Wema), the California Manufacturers Associaion, Burroughs Corp., the Computer and Business Equipment Manufacturers Association and the Association of Data Processing Services Organization.

Also testifying were the state Board of Equalization and local government officials.

A spokesman for Gonsalves said the information gathered will be studied and action may be taken by the committee early next year.

Under the provisions of a law passed earlier this year, software in California is exempted from taxation as tangible, personal property except for basic operating software.

Long-Range Goal

The exemption, however, is only for a two-year period and the committee is attempting to establish a long-range solution.

Spokesmen for Wema asked for legislation exempting all software from taxation, as tangible, personal property.

Or, as an alternative, they asked that the present section of the revenue and tax code that implements the existing law exclude mention of basic operating programs and be made permanent.

The state Board of Equalization favored extending the existing law for another year until more study is forthcoming.

Wind Tunnel Data Blows Smoothly Here

Special to Computerworld

CANBERRA, Australia – A new system is being designed and installed for the acquisition of data from the Federal Department of Supply's Weapons Research Establishment wind tunnels at Salisbury, South Australia.

Supply Department officials said a PDP-15/20 computer is the basis of the system and the signal conditioning, interfacing and control equipment have been designed locally.

The first phase of the installation, for the largest tunnel, was installed and commissioned earlier this year and the system will later be expanded to handle data from the blow-down tunnel and the low-speed tunnel.

The system was designed for the acquisition of data, on-line and off-line data reduction and display, and for the recording of data.

An important aspect of the design is that the attitude of wind tunnel models and the position of probes in the working section can be controlled by the computer.

Later, as software is developed, the system will be able to use calibration information to process the raw data on-line

Extra Shift Charge Drops for IBM Users

WHITE PLAINS, N.Y. – Users of IBM key entry and unit record equipment no longer have to pay additional charges for extra shift operation, effective Dec. 1.

Previously, machines of this type were classified under IBM's extra shift plan, i.e., they were subject to additional charges when used by more than one shift of operating personnel.

With nearly 70 models, such as the 029, moved to Rental Plan B, the user will pay only the monthly availability charge regardless of how much actual clock time equipment is used.

This change is seen as an attempt to present a clarified position on equipment rental. The machines moved to the new rental plan do not have internal metering capabilities and previously payment was on an honor system with the user informing IBM of any overtime.

As an example of user savings under the new plan, an IBM spokesman noted, a model of the 029 card-to-punch unit previously rented for a base price of $85/mo plus an additional charge of $85/mo if used on additional shifts.

Under the new arrangement such a user will only pay the base price of $85, he concluded.

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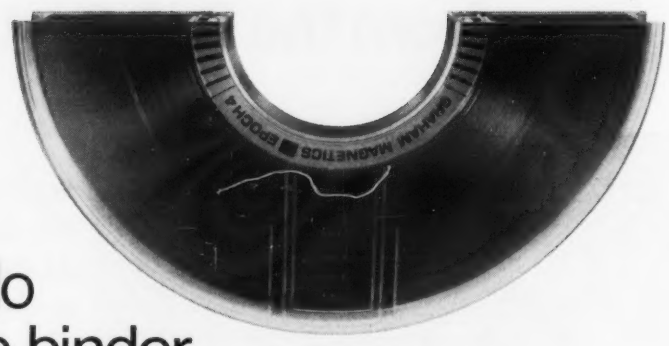

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Inmate DPers State's Gain

Special to Computerworld

CARSON CITY, Nev. – Inmate computer programmers at Nevada State Prison who are largely self-taught have done more than $200,000 worth of work for the state since 1968.

The programmers have been working for state agencies such as the Department of Motor Vehicles and the state data processing department, relieving staff programmers of some tasks or filling in during shortages of personnel.

Boyd Marsing, prison education supervisor, said 30 men have completed the academic portion of the program, which was initiated by the Motor Vehicles Department with an assist from IBM instructors.

After the program was underway, advanced inmates taught beginners.

Of the 30 men in the program, 10 found professional programmer jobs on the outside. Seven remain in prison and the rest have found other types of work, Marsing said.

"This is a successful vocational training and rehabilitation program," Marsing said. "But it has also been a real service to the state agencies these men worked for while in prison."

Selection Plan Advances School Busing

By Robert L. Glass

Special to Computerworld

SEATTLE, Wash. – Mandatory school busing for integration is working successfully in the Seattle public schools this year – and computers played an important role in making this success possible.

The busing plan is a product of over two years of preparation . . . and before that, ten years of research.

From the beginning, a computer was given the task of selecting the students who were to be bused. Out of a 58,000 student population in Seattle's north (white) and central (black) schools, about 1,200 were bused – 600 whites bused to central area schools, 600 blacks to north end schools.

The computerized selection process was an application of a technique called Geocoding, by means of which geographic data is encoded and made referencable. Geocoding was developed by the Urban Data Center at the University of Washington.

The Selection Process

The selection process began by building a data base containing all of the street segments in the city in X-Y coordinate form. Then another data base of student addresses was built from school files. Next, the student address file was matched with the street segment file in order to obtain X-Y coordinates for the addresses themselves.

Around each of the schools involved in the busing plan, a polygon was manually drawn, defining its proposed attendance area. The polygons were digitized and matched with the address file, and a resulting report listed students by polygon (school) to which assigned, school presently attending, and grade level. Name and race were included for each student.

The final step in the process was manual. Using such criteria as traffic patterns, population density, and safety, a set of bus stops was selected. Smaller polygons were drawn around each stop. Finally, a selection of students from within the small polygons was made, based on ethnic background and walking distance to the bus stop. These were the students who were bused.

Computer runs involved in this many step process were split between the Urban Data Center's IBM 1130 and the Seattle Public Schools' IBM 360/40.

Future plans call for busing of more students, and automating the remaining manual steps in the selection technique using network analysis theory.

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GENERAL ELECTRIC

WORLD LEADER IN INFORMATION SERVICES

Editorials

Learning a Lesson

It is refreshing to see a government act on the issue of computers and privacy as the Canadian Government has done, reacting to the release of the "Privacy and Computers Task Force Report."

Admittedly, the issues of computer data banks and individual privacy are complicated.

But there have been several studies on the issues in the U.S. during the past several years and still there is no concrete government action – not even a study commission to recommend guidelines for the government's own data banks.

The U.S. Government, so often the teacher, could do well to learn from Canada.

. . . From Little Acorns

Many of the marvels of today's mainframe systems are glamorously portrayed by vendors as emanating from their in-house development capabilities. This may be partially true.

But much of today's computer technology can be traced directly to the development of the transistor and the associated birth of solid state electronics at Bell Labs.

The first point-contact transistor developed 25 years ago this December is a far cry from the MOS semiconductor circuitry now in widespread use. And 25 years from now, computers will probably reflect the future development of laser, holographic or other technologies not yet born.

'Son, You Gotta Convince 'Em 1984 Is a Few Years Away Yet'

Long-Range Planning a Joint Venture

Management
By Frank Greenwood, PhD

The manager's breadth is stronger than the long-term planning at most installations. Day-to-day matters demand our attention and we concentrate on them rather than on tomorrow.

The future is in a much less comfortable realm, since dealing with it requires conceptual skills we seldom practice. Nevertheless, long-range planning is necessary. It provides lead time to meet future events; it is needed for control; and it supplies the basis for current decisions.

The manager of computer services can produce a good, logical five-year plan all by himself. But it will never be implemented. The controller, for example, is entitled to plan where the accounting area is headed and the computer people do not have that authority.

Executives responsible for results must have commensurate authority over their areas, including the planning. Long-term planning must, therefore, be a joint venture. (A user's committee is a good device to achieve this.)

A good planning format begins by defining enduring, general objectives. Next, specific goals are identified which serve as milestones on the way to the objectives. Then, strategies are developed for realizing these definite goals. Last, operating plans are made for guiding the daily work so as to move via the strategies toward the explicit goals, thereby attaining the long-range objectives.

Long-term objectives are enduring and timeless, stating what computer services is to achieve in the long-run. For example:

- To employ people, machines and methods effectively to help solve the increasingly complex problems of computer users.
- To provide for continuing, effective management and operation of computer services.

Goals are operating targets. More limited and immediate than objectives, they are the stepping-stones by which daily operations move toward your long-term objectives. Areas where you will want to specify goals include: hardware, software, personnel, budget, space and applications.

To illustrate:

Software – Specialized packages are paid for by the using departments. Accordingly, the numerical control package – which we expect will "go live" by June 1973 – will be paid for by manufacturing.

Applications – At the planned budget levels, we have some xx man-weeks per year available for systems work on new applications and about yy man-weeks per year of programming help for these new systems. It will, therefore, require approximately five years to implement a particular group of applications divided into the areas of general design, detail design, programming and implementation.

You will probably have mixed emotions about users, as the fellow had who watched his mother-in-law drive his new car off the cliff. Some users who have spent their entire careers in marketing, manufacturing, etc. acquire astonishing (instant) knowledge of computerized systems.

These fellows will repeatedly set you straight on your business, volunteering, for example, how you can design, program and implement a large data base and its reports over a long weekend.

The strategies to use in achieving your goals concern the fundamental factors controlling your success. You will want to consider at least your user, budget and management strategies.

Your user strategy requires defining the needs of your "markets" (internal and outside customers) and then determining how to service them. Your budget strategy involves keeping costs as low as possible consistent with a satisfactory service of effective management in computer services.

Operating plans guide your daily work, ensuring that you follow your strategies to reach your goals, thereby moving toward your long-run objectives.

You probably want to work with annual operating plans. Obviously, the clearer idea you have of what you want to achieve, the higher your probability of doing the job.

Accordingly, each individual in computer services defines his goals for the next year. They need to be spelled out as precisely as possible in terms that are operationally meaningful. Each person also carefully plans how he will reach his goals. The method is up to the individual; what his supervisor looks at is the result.

The individual must have a big say in choosing his goals (or be uncommitted to them) and he must be free to use his own methods (or be crippled by foreign procedures). Clearly, the individual's goals need to mesh with overall operating plans and with your long-range plan.

Producing a five-year plan is demanding. Consider this format: defining enduring, general objectives; identifying specific goals; developing strategies; and making operating plans.

Using the format implies you have real knowledge of your industry; that you can involve your users and pursuade busy, senior executives to help you choose future applications; and that you understand managing by objectives and can produce a meaningful operating plan.

Again, long-range planning is mandatory. It "buys" you lead time to meet future events. You need it for control. It provides you a sound basis for your current decisions.

(Frank Greenwood is director of the computer center at the University of Montana.)

Letters to the Editor

Fear of Failure No Longer Viable

I was considerably disturbed by your recent article "Users Reticent to Move Away from IBM" [CW, Nov. 29], especially the fear of failure expressed by a large number of data processing managers. Frankly, the fear of failure from using non-IBM equipment would have been much more appropriate several years ago.

Today, there are a number of very fine reputable manufacturers who have built up several years' experience of reliability and service.

Any data processing manager who is serious about considering alternate suppliers, can readily check other data processing organizations for their experiences, either with a particular vendor or with independent suppliers in general.

Over the last several years, our data processing organization has experienced severe budget restrictions. This has forced us into investigating and adopting a number of cost reduction measures, including the much dreaded personnel reduction.

More positive measures included third party leasing, purchase of selected equipment, and use of plug compatible peripherals. These hardware actions have netted the company hundreds of thousands of dollars over the last several years in hard cash savings.

Such hardware savings have enabled us to operate within tight budgets and to minimize personnel cutbacks.

The issue is clear for data processing management: we must make basic business decisions that favor our stockholders. If we, as part of the company's management team, are afraid to make such recommendations or decisions, then we lose the right and privilege of being part of the team and should be replaced.

Robert J. Supp
Director
Management Information Services
Varian Associates
Palo Alto, Calif.

Fletcher Jones' Legacy

The two inch, front page story [CW, Nov. 15] hardly does justice to the passing of Fletcher Jones.

Fletcher Jones was a pioneer in the industry which evolved into a giant industry that spawned such periodicals as *Computerworld, Datamation* and *EDP Weekly*.

Jones and company amassed an unprecedented staff of computer professionals, which has made and continues to make historical contributions to the software industry.

Dale H. McCallon
Alphanumeric Publication
Systems Inc.
Los Angeles, Calif.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Spooling to the Rescue

Single Form for All Output No Longer Justifiable

The Taylor Report
By
Alan Taylor, CDP

Back in 1957 I witnessed some marvelous new computer output being produced at about 5,000 line/min. It was the Rank Copy Flow Xerographic Printer and what interested me was not so much the speed of the output, as the ability of the printer to selectively change the printed form to match the contents of the particular output item.

For instance, a short form could be used for one- or two-line items, and a longer one could be used for 20- line items. You could also use separate continuation forms, as opposed to repeating copies of the first page.

In a business environment, you could use one form when a payment was overdue, and another one for prompt payments.

There are many advantages to this approach from the point of view of good forms, but 16 years later, we find most computer installations assuming a single printed form must be used for all varieties of output produced by a single computer run.

The same form is used for the person whose accounts are overdue, as for the person whose payments are on time – and even for the person who does not owe anything at all.

The same form is used for people who are familiar with the company's operations as for the person who has never received such a form before. This just does not make for effective communications.

This singularity of forms hurts clean form design. It greatly inconveniences the users of these forms, particularly if the users are the general public.

The general-purpose form design originated because a file has to go to a printer, and it is not practical to stop the printer to change the forms each time a new situation arises. This concept survived the Copy-Flow developments because problems arose with multiple copies, cutting the paper, etc.

These objections were perhaps reasonable, but since then, there have been new developments which can overcome these problems.

Spooling to the Rescue

The answer is "spooling." We no longer run our printers directly off the application program. This is a waste of computer time, as it lock-steps computer productivity to printer operations. Instead, most large installations use spooling of one type or another – files that are to be printed are sent out to a disk, and held until the printing is initiated.

As an example, suppose a program produces output for three groups of people – people who have not paid up, people whose payments are on time, and people who have never received a bill and may not be familiar with the system. This is a common enough situation, and one which can easily be detected in the program.

The people who have not received a bill previously will have a zero carryforward balance, and will probably have a particular code attached saying "add them to the master file." People whose payments are not up-to-date may have finance charges, aging characteristics and a different balance.

The bill design, of course, differs in each case. In the case of the new customer, no reference is needed to previous balance. On the other hand, some explanation of the form itself should be included.

In the case of the person whose bills are not paid on time, some space on the form is needed to handle any charges that are challenged, or if the person seeks additional credit.

With regard to the person who is simply routine, a space can be provided for some appropriate "thank you" for being one of the nice regular customers.

Appropriate Emphasis

Using this type of forms design allows each area to get the detail it needs, with the appropriate emphasis. This could not be done on the computer itself because computer printout with its all-capital-single-size-detail is still one of the biggest drawbacks to the understanding of computer output. So far this cannot be avoided with the equipment most installations have.

But the provision of separate printed forms for each category is perfectly reasonable. The additional amount of systems design work is probably much less than you think, and the printing costs will be very low.

Patch printing that changes the instructions is part of the regular operation, and when the output goes to the disk for normal spooling it can just as well go into separate files. Then, all the output with one form can be printed; the paper can be changed for the output with the second set of forms, etc.

This system would greatly enhance the usefulness of computer equipment. Perhaps 16 years ago the decision to ignore the user and his problems, and so not to use real-time printing of forms was justifiable.

But I cannot see any justification in 1973 when all the equipment needed is already on-site including all the necessary software. All that is needed is a little more systems design, a little more warehouse space and a few more instructions for the computer operators.

Businesses will get improved relationships with their customers, which will more than offset the extra work.

Certainly the concept of spooling should be taught in the data processing schools, and should be discussed in professional conferences. It is not, however, because it generally involves some reprogramming.

Well, I will be surprised if the data processing profession is frightened of additional programming needed to send the output to separate files.

The data processing professionals I know care about their customers and the users. Unless employers prevent it, I am sure the current general-purpose form will shortly be a relic of the past.

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ACM Offers Goodwill (Little Else) to Consumers

Taylor Thoughts

Early in December an interesting news wire story appeared on the front page of the *Boston Globe* – and doubtless in many papers across the country. The article told of an over-30,000-member association that is helping the consumer get fair play from the computer. The editor's decision to put it on the front page indicated how important he judged such a program would be for the public.

The article gave three examples of the program's success. These examples dealt with an insurance company billing system that continued to send out bills after the consumer cancelled the policy; a magazine billing system which charged for magazines the consumer had not received; and a dating system which advertised the use of a computer which was not used (apparently some people are still impressed by the glamour of the computer).

These cases were solved and "in all three cases, the computer was wrongly criticized," said Gordon Smith, executive director of the organization.

So far – so good. But, unfortunately he then went on to generalize from this small sample.

"There is," he explained, "a tendency to unfairly blame the computer for a whole series of social and technical ills which face society today. If there's a mistake on one of your monthly bills, for example, the company may tell you, 'There's nothing we can do. The computer made the mistake.'

"Of course, that's not true. It's the person running the computer who erred. We [the association] want to use our expertise with computers to help clear up problems and counter the 'blame the computer' syndrome," Smith said.

ACM Ombudsman Program

The association concerned is the Association for Computing Machinery (ACM). The program is the Ombudsman Program, started by Walter Carlson, the former ACM president. Carlson thought that computer people could best handle computer-related problems as a public, volunteer service.

The service still operates as an unfunded, volunteer service – the local ACM Ombudsman calls the DP manager concerned, and carefully writes down what the DP manager says.

The program has had some limited successes – like those indicated by Smith – but these successes do not even begin to prove the computer is blameless for the 'whole series of social and technical ills' Smith referenced.

Indeed, the current function appears to be much more an exercise in public relations, which directs blame for these ills away from members of the association, and onto the poor defenseless 'person who is running the computer.'

Smith does not describe exactly who is in error, but it appears to be a shift supervisor who forgot to put some input into the system or perhaps an operator who ran a program with bugs in it.

Shift supervisors and operators are rarely members of ACM, and are technically outclassed by ACM chapter officials. They can be convenient scapegoats, hiding the problems created by the actions and inactions of ACM members.

The problems involved in computer systems are not so much at the operational end of the system – but in the lack of testing, the poor languages and the lack of understanding of how to test.

These problems are not the province of the shift supervisor, but they are the "expertise" of ACM members – particularly of the institutional members – a group of members which includes dozens of universities who are so expert in computer matters that they give (or more accurately "sell") four-year courses in computer sciences.

They should have researched the problems involved in the use of tested and untestable programs, and methods of economic, yet effective, documentation. The absence of such research and teaching may well be the real reason why a test left out of a program is undetected before it goes into production.

Why should the programmer and the operator get all the blame from ACM, while its university members are left blameless?

Nor does Smith mention another class of ACM membership – its corporate members. These are the great computer marketeers – IBM, Honeywell, etc. They are also left blameless. Yet they may have a major role in the "social and technical ills" Smith is so concerned about. After all, they urge computer systems on customers, design new systems and try to find uses for them.

The rush to use – and therefore need – more and more powerful hardware – and to accept flawed software – certainly has some connection with these 'ills'. Yet the ACM Ombudsman program shields this member group also.

There are two points that will probably be raised in favor of the program. One is that the overwhelming majority of ACM members are neither institutional members, nor corporate members. True – but the influence of these members seems to be very great.

Three of the four presidents since 1966 have been professors employed by universities, and the other was the originator of the Ombudsman Program, Walter Carlson. He is employed by the greatest marketeer of them all – IBM.

The other point is that perhaps the ACM Ombudsman Program has not been contacted about any of the "technical and social ills" Smith was talking about.

One would think an association with nearly a million dollars in annual dues would not be stopped by a lack of funds, but currently the Ombudsman Program, like the Social Implication of Computers program, is practically unfunded. Goodwill – yes, but any portion of the funds – no, seems to be the ACM attitude.

Well, perhaps you can help the ACM Ombudsman Program. If you write to me telling about a problem that could be one of those 'series of social and technical ills' being blamed upon computers, I will send it on to Smith, and see whether he still believes the computer is being unfairly blamed.

And we'll see whether the Ombudsman program will continue to offer "goodwill" but little else when it comes to the consumer.

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Random Notes

Storage Option Saves 10% On Deferred Call/370 Use

NEW YORK – Users of the Service Bureau Corp.'s Call/370 time-sharing network may save 10% to 40% of their current storage costs by utilizing the Reference Storage option, which limits them to read-only access to files during prime time, but allows updating in the evening, based on requests entered during the day.

Both Reference Storage and support for 250 char./sec transmission speeds will be available in early February, the company said. The higher speed will allow users to accommodate larger I/O volumes than they can now, a spokesman noted.

'Mark IV' Being Adapted to Run On Univac 9400 and 9700 CPUs

CANOGA PARK, Calif. – By the end of next year, the Mark IV file management system will be available for Univac 9400 and 9700 users and for a broader range of Siemens 4004 users as well, according to the developer, Informatics Inc. Mark IV currently is available for IBM 360/370 and for Univac Series 70 users.

The new versions will be compatible with the current implementations and will operate under Univac's DOS on the 9400, and under Operating System 4 and 7 on the 9700. The new Siemens implementation will function under that equipment's DOS, whereas it is currently limited to the Siemens Tape Disk Operating System (TDOS).

'Scert' Simulates IBM's VS

ROCKVILLE, Md. – Scert, the computer system simulator from Comress Inc., has recently been enhanced to include the capability of simulating IBM's virtual memory system. This support is said to include all of the operating systems: OS/VS1, OS/VS2 and DOS/VS.

The Factor Library, key to Scert's simulation ability, has also been extended to include CPU and other data related to the 370s, the company said.

Comress Inc. is at Two Research Court, 20850.

Beloit Adds Text Editing

BELOIT, Wis. – A text-editing service called Supercomp, covering all operations from original data entry at a user terminal through preparation of a final photocomposition at a data center here, is now available to subscribers of the Beloit computer time-sharing network.

Air courier service from Chicago's O'Hare field is used by Beloit to get the finished work to the user between 24 and 36 hours after the request is entered, at a cost of $5 to $7/page.

The company has branch offices supporting local dial-up service in Illinois, New York and Washington, D.C., and is headquartered here at One St. Lawrence, 53511.

Army Validator Says:

Use 'No Data' Tests to Check Linkage

By Don Leavitt
Of the CW Staff

ST. LOUIS – System testing on large applications should never be handled by the programmers who wrote the modules involved, and the first stages of system checkout shouldn't use any data, even in test files, Donald A. Saari argues.

As chief of the readiness validation division within the U.S. Army's Management Systems Agency, Saari feels that isolating the programmers from the testing, at the systems stage, provides an objectivity that wouldn't otherwise be possible.

And the "no data" testing is the best way to locate discrepancies in individual Job Control Language (JCL) statements, in catalogued procedure libraries and in file references without getting bogged down in the details of the instruction-by-instruction program logic, he said, noting that it should have been checked out previously in any case.

Thorough Testing

Each module in any major system must be thoroughly tested before being turned over to the system tester, just as it would be before being released to an end user for production. The main objective of systems testing is to see whether someone familiar with each of the parts can put them together and make the system run, using the documentation provided, Saari explained.

The potential for successfully assembling and executing these components the first time is limited at best, he added, but initial tests using nothing but dummy files should find the weak spots in the system more quickly and at less cost than even very limited test data. Test data inevitably gets the tester into the application logic and that should not be the focus at this level of testing.

Preliminary Validation

Instead the tester should be trying to perform a preliminary validation of the individual module job streams, according to user documentation, and to set up and validate JCL for the systems test/production environment. He has to check out the system libraries in terms of executable programs, and to determine the "reaction" of each module to the system situation.

Master and transaction files for these purposes should be labeled and positioned just as they would be in production so the JCL need not be specially modified for testing.

Depending on the peculiarities of the system, Saari noted, it may be necessary to create some files with one header record to get through initial housekeeping and through the test run.

System test personnel should be on site for the first run-through, Saari said, to make any necessary JCL changes and to guide the operators through the documentation. This initial run will normally require "considerable" hand feeding to carry it through, he warned.

A "no data" test can be run in a fraction of the time any other test, even with limited test data, can be performed, but it is enough to check referencing of program libraries, opening and closing of files, and referencing of transitory data as it is passed from module to module. Missing components of the system are identified, and program-to-program transitions are confirmed or corrected.

More than that, however, the accuracy of the JCL is validated beyond any point that it could be by the individual module programmer, and – in a limited way – the logical processing and interfacing between the user modules, the system software and the required utilities can all be checked out through "no data" testing, Saari said.

'Panvalet' Grows From Librarian Into Broader Management System

OAK BROOK, Ill. – With the current release of version 7 of Panvalet, Pansophic Systems has added significantly to the features and flexibility of the package that started out as a program librarian system.

User exits have been provided to link the capabilities of this package with those of others or of user own-code routines, to build more complete program production systems or to strengthen management control. One user has, for example, linked Panvalet with a Cobol preprocessor.

The new version is said to give the Panvalet user more flexibility than he had previously in his library organization. Variable-length blocks and variable numbers of blocks for each member of a library allow more effective use of the disk space available to the user.

The user may define both the blocking factor and the number of blocks in each directory. Blocks themselves may be from 500 characters to full tracks in length. An individual member of a directory may use as many as 65,000 blocks.

As a security measure, managers can suppress the use of specific Panvalet commands by members of their staffs, although they can override the suppression if the need arises.

The system now supports the concept of supersets and subsets of data on the library. Thus users may define payroll as the overall focus, and subsets of daily data pertinent to that application; and details at that level can be extracted from the superset, or summarized for weekly or monthly processing.

Full backup for deleted programs is another enhanced element of the system.

The DP manager triggers the deletion run, but even when they are taken off the active library, programs are stored on tape. All versions of deleted programs are carried over so the full history of a project could be reconstructed if needed.

The Panvalet utilities have been improved, the company said. The disk dump now is "400% faster" than before and a full disk can be dumped in 15 minutes.

Pansophic is at 1211 W. 22nd St., 60521.

Data Form Change Cuts Census File

WASHINGTON, D.C. – Changing the form of some data while eliminating none, Applied Urbanetics has been able to reduce the full set of 1970 "Fourth Count" Census Bureau statistics from 141 reels of magnetic tape to 17, and the cost of the data base from $9,870 to $3,200.

The modification cuts the cost of working with the data even more dramatically than the cost of originally acquiring it, the company said. Under Fortran, the cost reduction in reading the tapes and getting the data ready for processing may be "in excess of 1,000 to 1" compared to conventional tapes, a spokesman claimed.

The compactness of the data and the ability to use it quickly are made possible through work done by Applied Urbanetics to convert every numeric character string on the standard census file to IBM internal representation numbers, in binary format.

The result is that the numeric data fields are generally smaller than before, and they are immediately processable by 360/370 programs without processing time-costly data conversions. Program cards for reading the tapes and detailed documentation are supplied by the company, the spokesman noted.

The files, recording at 1,600 bit/in., may be purchased on a state-by-state basis with prices ranging from $120 to $240 depending on the number of reels involved. Volume discounts for multiple states or multiple copies of individual states may reduce the per-state cost by as much as 33%, he said, noting again that the entire file cost is $3,200.

The company is at Suite 1103, 1101 17th St., N.W., 20036.

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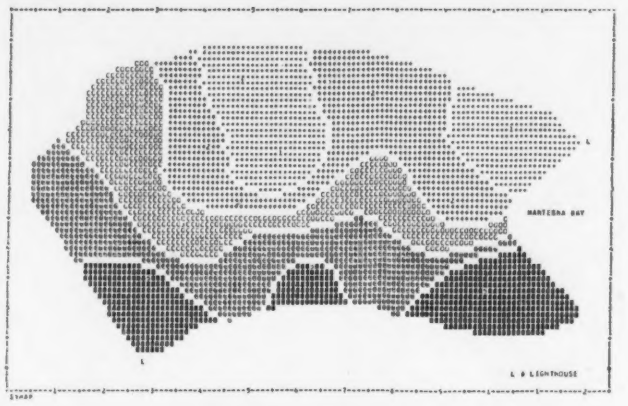
'Symap' Uses Standard Line Printer To Produce Contour, Other Map Types

CAMBRIDGE, Mass. – Users with large-scale 360/370 installations can perform a variety of graphic mapping operations with several different Fortran IV programs recently released by the Laboratory for Computer Graphics and Spatial Analysis at Harvard University. Some use a line printer, some a line plotter as their output medium.

Symap uses a line printer; combinations of standard symbols are used to create a scale of tones from white to black, corresponding to value categories for spatially arrayed information.



Symap-generated contour maps may include area identifiers, symbols for man-made structures and labels for natural features, as well as scaled borders for cross-references.

Contour Option

Three map types can be generated. The Contour option creates lines that connect all points having the same numeric value or height. The area between each pair of lines is shaded with the user's choice of shading.

Conformant maps show the value assigned, or height, of every data point, line or area as defined by the user. Proximal maps tend to be "blocky" like conformant versions, but in this case the areas are constructed by the program with boundaries equidistant from neighboring pairs of reference points. Each area is shaded to reflect the value of its particular center point, a Laboratory spokesman noted.

Input may consist of data, such as census information, identifying the characteristics of predefined areas, or portions of an array, or data showing the characteristics of specified sample points only.

Mathematical computations can be performed on the input data, if necessary, before mapping. Options are provided for the rescaling of raw data and for variations in symbolism used.

Symap has electives permitting flexibility in map size, scale and number of value ranges, as well as the insertion of borders, histograms and what the Laboratory calls "map cosmetics."

Symap uses 150K bytes on a 360/370, along with three temporary data sets. It is currently available, with supporting documentation, and costs $776 for commercial users, $485 for educational or non-profit installations.

Three Dimensions

Symvu generates a three-dimensional perspective view of a statistical "surface" on a line plotter, deleting lines that are hidden from view. Once a surface is defined, a user may produce a wide variety of different views based on rotation, tilt, vertical scaling, symbolism or other characteristics.

The program accepts matrices of values as large as 130 data elements, including, if desired, data generated by Symap.

Effectively, Symvu produces the same types of maps – contour, conformant and proximal – as Symap, but with the added visual impact of the three-dimensional presentation.

Symvu requires a 220K partition or region on a 370, and three temporary data sets plus a data set for the plot tape.

This package is also available now, priced at $575 for business or commercial sites and $360 for schools, colleges and similar institutions.

The Laboratory is at 520 Gund Hall, 48 Quincy St., 02138.

Users Pay Surcharge

Users of Brandaid market planning service [CW, Nov. 1] are charged $6,000/quarter year, in addition to the cost of initial customization and normal operating costs on the time-sharing net on which the package is installed.

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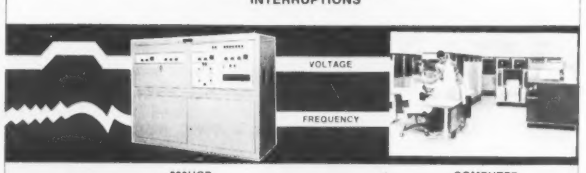

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PSC

Two Users Learn the Hard Way

Small Distributor Turns Inward for Software Support

By Edward J. Bride
Of the CW Staff

CINCINNATI, Ohio – Many people believe only the largest users have computer time to sell or can modify software across manufacturer lines.

But CM Sales Associates here has done both.

The distributor of Hartz Mountain pet supplies has advanced from an IBM 1130 to an NCR Century 100 and back to a Century 50 over the past three years, changing its own software for the basic application – keeping track of stock and printing invoices.

DP manager and executive vice-president Joseph Cordrey said the company did not want to get into data processing, but there was no other way his small company could operate efficiently.

Even so, the efficiency has not been as great as what was promised, and so CM Sales is serving two other distributors in order to make the computer operation pay for itself, Cordrey reported.

Cordrey was unhappy with the applications support he was receiving, and so he started writing his own programs in a language mix between Cobol and NCR's small computer language, Neat/3.

The Small Systems User

Invoices Before Orders

CM Sales actually prints invoices before orders are filled, since the data base includes inventory updates; if discrepancies do occur, the order filler circles the item and an adjustment is made later.

This method of operation has improved the flow of goods and cash, officials said. Instead of taking a week or 10 days to update accounts receivable, the next day's business is billed as soon as salesmen turn in their day's orders, according to Ernest C. Cordrey, company president and father of the DP manager.

Time Saver

Daily updates of billing files take less than an hour, while the old method was "very laborious and would take between four and five hours," he noted.

Orders are filled much more easily with the "picking list" printed in location sequence, he added.

CM Sales now processes an inventory and billing system for two other distributors, through service contracts.

The customers have punched paper tapes delivered to CM Sales by an overnight courier, and within 24 hours the invoices and reports are processed.

Cordrey said there are no immediate plans to sell the software as a package, but he does plan to process work for additional distributors.

Flood Forces New Self-Reliance

ARCHBALD, Pa. – The floods from tropical storm Agnes may have been a blessing in disguise to some small users, especially those who escaped the brunt of the wind and rain.

American Cabinet Corp. (ACC) here is a case in point.

When IBM had to rearrange priorities to support some larger users, the cabinet manufacturing company was forced to change its posture from 100% reliance on IBM for program support.

Instead, according to controller Richard Watkins, ACC hired its own programmer, and now expects to double machine utilization, obtain more useful data, and make a few dollars selling software on the side.

ACC had relied on IBM's Scranton office for turnkey software, and obtained its first three applications in this manner. Payroll, inventory control, and accounts receivable were developed for ACC by IBM for the user's System/3 Model 6.

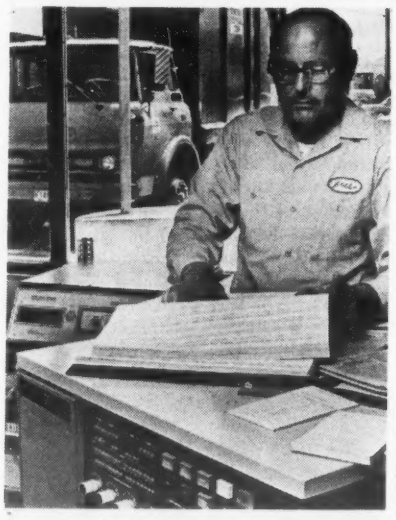
Watkins figured the company had invested some $2,300 in developing the payroll package, which ACC has in turn sold to another user. The company will "turn a profit" on the package if it sells two more, since it is charging $1,000 for it.

But the real value of an in-house programmer comes from program maintenance, not development, Watkins commented. When he was relying completely on IBM for software, he said, the 3/6 was used only about 30%-40% of the time, and now Watkins anticipates a 75%-80% usage.

Additionally, "there is value to information," he commented, and the new applications will help management make better decisions.

Besides increasing operating time, ACC has taken other hardware options to increase price/performance.

These include an extra 8K of memory, a two-way (right-to-left, as well as left-to-right) printer, and an off-line recorder.



'Garbage Out'

City of Seattle, Wash., employee Jesse B. Brown reviews computer reports that have helped speed up refuse disposal operations. IBM System/7s are used at two solid waste transfer stations to control traffic lights that guide collection vehicles onto truck scales, calculate the net weight of each load and identify and bill the private contractor through his credit card. On peak days, both stations handle up to 3,700 vehicles and 1,500 tons of waste.

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COMMUNICATIONS

Data Briefs

Line Adapters Replace IBM Units, Can Save $500

SUNNYVALE, Calif. – Anderson Jacobson Inc. has a series of modems designed to replace IBM line adapters for use by private line data users.

Designated the Series L 150/12, the units can save users more than $500 on purchase price or $10/mo depending on model, an Anderson Jacobson spokesman said.

The units utilize frequency shift keying and can operate on both 2-wire and 4-wire point-to-point and multipoint data nets. Four models are provided in the series which is a direct replacement for IBM's limited distance, leased line and shared line adapters. Prices range from $165 to $240 and monthly rentals range from $8 to $10, a spokesman said.

First deliveries are scheduled for the first quarter of 1973. The company is at 1065 Morse Ave., 94086.

Burroughs Adds CRTs

DETROIT – Burroughs has introduced the TD 800 CRT display system which can communicate with Burroughs and other CPUs over dial-up and private lines.

The system can also be used as a mainframe console for local input and data display. The TD 800 can operate with the Burroughs TC 500, 700 and 3500 intelligent terminals and has a display capacity of 960 or 1,920 characters.

The 960-character model costs $4,750 or $112/mo while the higher capacity display costs $5,490 or $138/mo. First deliveries are scheduled for the second quarter of 1973.

Minis Get Multiplexer

ANAHEIM, Calif. – General Automation has added to the SPC 16, 40 and 45 minis an asynchronous communications multiplexer that can interface up to 32 full-duplex data sets.

Characters transferred from the CPU to the 1590 are transferred serially to the data set without the need for program control. The multiplexer costs $3,125. General Automation is at 1055 S.E. St., 92805.

Display Has MOS Memory

PENNSAUKEN, N.J. – Video Systems Corp. has added an MOS memory to one of its CRT units. Designated the VST-1440, the display has a capacity of 1,440 characters with a teletypewriter keyboard plus a 10-key numeric pad.

The display can operate at switch-selectable speeds ranging from 110- to 1,200 bit/sec and can generate all 128 Ascii characters. The CRT can display 64 Ascii characters in 80-character lines.

The VST-1440 is priced at $1,995 from the company at 7300 N. Crescent Blvd., 08110.

Resources 'Rationed'

Management Terms Applied to Data Nets

By Ronald A. Frank
Of the CW Staff

ANAHEIM, Calif. – Computer communications networks which include interconnected DP sites also create management problems that parallel classic wholesale/retail relationships. And management terminology, analysis and problem-solving techniques are being applied to these situations.

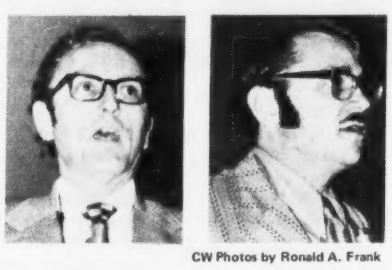
Despite the technical complexity of many resource-sharing networks, conventional business distribution methods are being used to allocate costs and available CPU time, according to speakers at a session here on computer network management.

Available computer resources are a valuable commodity that must be "rationed" among the organizations entitled to access such facilities, noted Leland H. Williams, president and director of the Triangle Universities Computation Center (Tucc) in North Carolina.

The non-profit computation center is essentially a wholesaler providing its services to subscribers, who in turn retail those CPU resources to the end user, Williams explained. Tucc serves schools and colleges throughout the state.

Management Voice

While the center provides a resource "wholesaling" function to the institutions it serves, it also provides the "retailer"



CW Photos by Ronald A. Frank

Williams Uhlig

(the school) with a voice in the management of the operation, Williams said.

"Essentially our 370/165 is four separate machines and its resources are rationed out to the schools so everyone gets his fair share," he said.

A similar concept was described by David Grobstein and Ronald Uhlig of the Army's Material Command. The wholesale/retail concept applied to networks of interconnected CPU sites provides a better understanding of the management structure of these systems, Uhlig said.

These nets are similar to business corporations which have centralized production with decentralized control of consumption, he added.

The management of a resource-sharing network would like to collect all available CPUs into one room and then "slice them up" for each user according to how much of the total capability each needs, Uhlig said. But since this is impossible, the users will have to be satisfied with a "ration of time," he said.

Machine Fits Job

A major advantage to the user is that he can now find the machine to fit his job instead of having to tailor his job to fit only one machine, Uhlig said.

With the Tucc concept of one major regional center, the wholesale function remains decentralized, Williams said.

One of the problems with the management concepts' being applied to these network relationships is that the absence of market competition can hurt the user, the session participants agreed.

Bert Herzog, director of the academic Merit computer communications network in Michigan said today's limited state nets are undoubtedly the forerunners of future national resource-sharing networks.

The management of these nets should guard against possible conflict of interest situations where users and retailers are one and the same, Herzog said. If the management complexities of implementing the Merit network for schools had been considered in the design phase, the net might never have been built, Herzog said.

Proposed FCC Registration Plan Could Aid Interconnection User

WASHINGTON, D.C. – A proposed "registration" plan that would expedite approval of customer-owned data and other equipment has been prepared by the Federal Communications Commission's chief engineer.

The registration procedure would be applicable to all non-carrier equipment to be "directly connected to the switched telephone network," according to a report issued by the commission's technical division.

Similar in nature to present type acceptance procedures, the registration plan "would be based on information and measurement data submitted by the manufacturer or prospective user and evaluated by the commission," the report said.

Data submitted by both users and vendors would have to comply with technical standards specified in the FCC's rules and regulations, according to the report. These standards would be based on "the interface criteria developed by the various [FCC interconnection] advisory committees," the study said.

Any independent equipment complying with the technical standards "would be registered and considered authorized for direct connection" to the telephone network, the report said. Testing of equipment for registration would be done "by any organization which demonstrates its ability to perform the required tests."

Stating that technical standards for customer-provided equipment "should be uniform throughout the U.S.," the report urged the "cooperation and active participation of state regulatory agencies," calling this "essential for the effective implementation of an interconnection program."

The distribution and sale of interconnection equipment which does not comply with technical standards and has not been registered present an additional problem, the report said.

"Although we know of no instances where such connections have caused harm to common carrier facilities," this type of problem should be considered, the FCC document said. While the proposed registration program "would cover the user of the devices," it would not directly apply to the manufacturer, it added.

Equipment causing harm to the telephone network could be disconnected but the complainant will have to "demonstrate that an actual harm exists."

A condition of harm would exist if equipment were operating outside the interface standards or if it had been installed so there was "imminent danger" that the interface criteria would be exceeded, the report said.

The registration of equipment would be initiated by the vendor who would pay two fees according to the proposal. For data processing equipment $500 would be required for registration and a "grant" fee of $100 would be required at the time the procedure was completed. Data equipment which included network control signaling would cost $800 for registration and a $200 grant fee.

Buffer Allows TTYs 1,200 Bit/Sec Speed

FALLS CHURCH, Va. – Pulse Communications Inc. has introduced a terminal buffer with built-in memory to allow teletypewriters to operate at 1,200 bit/sec.

With a 4K character memory, the buffer allows Model 33 or 38 TTYs to store data for transmission at the higher speed.

Designated the Model 7132, the buffer eliminates the need for magnetic tape storage and is less expensive than CRTs. First deliveries are scheduled for March 1973. The firm is at 5714 Columbia Pike, 22041.

Now...get both in one... a batch terminal and a time sharing terminal.

No longer is it necessary for the batch terminal user who has a need to access a local time sharing system to maintain a simple, low-speed terminal just for this purpose in the same office. Sycor now has eliminated this expense by adding low speed (100-300 baud) asynchronous communications capability to its Model 340.

A Sycor 340 user can access any major time sharing system, input the problem, receive the solution, and continue with the data entry operation. Captured data then can be batched to the central computer facility at 1200-4800 baud speeds using IBM-compatible BSC procedures.

In addition to this unique dual communications capability, Sycor provides users with T.A.L., a programming language developed specially for data entry applications. A wide choice of peripherals also is available– printers ranging in speed from 30 cps to 200 lpm, 7 or 9 track magnetic tape drives, and a 250 cpm card reader.

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SYSTEMS & PERIPHERALS

Bits & Pieces

Digitizer Plots X-Y Accurate to .001 In.

BROOMALL, Pa. – The Model 55-R digitizing system measures and records sequentially numbered points of X-Y coordinate data to .001 in. resolution, according to Broomall Industries, Inc.

The system consists of a control unit and a standard digitizing table – measuring 48 in. by 60 in.

Data can be recorded on punched cards, punched tape, magnetic tape, flexowriter or electric typewriter, the firm stated.

Additional features include: full-scale zero offset with preset; output scaling; variable word length formatting; code compatible to standard output devices; automatic readout; multiple output; and keyboard entry into output word.

Optional features include grid round off, constant data entry and additional scaling.

Prices range from $12,000 to $16,500 from 515 Abbott Drive, 19008.

Mini Offered to Insurance Firms

NEW YORK – Olivetti Corp. has announced a minicomputer especially designed for insurance companies.

The P 603 uses microcoding to operate as an electronic accounting computer or as an aid in preparing policies and endorsements, the firm stated.

A user application, for example, would be attaching the unit to other peripherals – e.g., magnetic tape, paper tape reader – to store all the liability and physical damage rates for several insurance companies.

Lease rates range from $165 to $285/mo from 500 Park Ave., 10022 or any branch office.

D-116 Mini Users Get Upgrade

FAIRFIELD, N.J. – Digital Computer Controls, Inc. has released a 32K version of its D-116 minicomputer.

Priced at $18,050, the CPU comes with 32K core memory, power supply, TTY interface and I/O capability for four peripherals from 12 Industrial Pk., 07006.

Tape Drives Go to Interdata Users

SUNNYVALE, Calif. – Users of Interdata 3, 4, 5, 70 and 80 minicomputers can obtain compatible tape drives, according to Bright Industries.

Tape decks are available in two sizes: BI 2600 – 8-1/2 in. deck – or the BI 2610 – 10-1/2 in. deck. Data transfer is variable on both units with tape speeds of 35 in./sec, 37-1/2 in./sec and 45 in./sec.

Data can be transferred on either the program I/O channel, the selector channel or the multiplex channel. Parity and redundancy checking is built into the controller – so the drive is IBM-compatible, a spokesman noted.

Price of the BI 2600 with 1108 controller is $7,532. The cost of the BI 2610 and 1108 controller is $7,623. Delivery is 90 days from 686 W. Maude Ave., 94086.

Shows Internal Activity

Monitor Promises Better System Use

By Michael Weinstein
Of the CW Staff

CHEVY CHASE, Md. – The Micro-Sum monitor from Tesdata Systems Corp. is designed to allow the user to see on a display screen the frequency and duration of internal computer activities and from this information take steps to improve system operation, according to the developer.

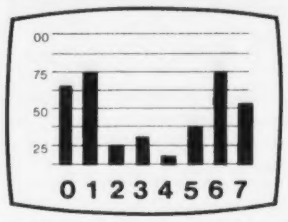
Connected directly to the host computer during program execution, the monitor stores a record of activities and arithmetically averages them for display on the CRT screen in the form of a bar graph with eight bars, a firm spokesman said.

Each bar represents a different system function – e.g., CPU time, time used for disk seeks, channel activity – indicating the percent of time each function was active during program execution, he added.

The user can specify what activities will be monitored – such as peripheral functions, time in system state and time in work state.

System Capacity

This capability allows the user to monitor job processing and determine actual system capacity, determine the optimum system configuration for the workload, schedule job streams for efficient resource utilization, determine which programs degrade system performance and determine system imbalances caused by data organization, the spokesman continued.



Display shows internal activities of system.

For example, the display on this page indicates high CPU activity and low channel activity – bars 0, 2 and 3.

The display shows that the system is highly compute-bound. The possible cause could be scheduling I/O- and CPU-bound jobs concurrently in a multiprogramming environment. This often results when the nature of the jobs in the stream is not fully understood, the spokesman noted.

Corrective Action

Using the information on the display, the user can take corrective action such as entering in the stream an I/O-bound job with a higher priority than the CPU-bound job. If necessary, the user should lower the priority of the job in execution, he suggested.

General options include real-time clock, column printer, magnetic tape transport, report generator software, remote operating stations and remote slave displays.

The Micro-Sum is the low end of Tesdata's System 1000 line which consists of hardware measurement processors ranging in cost from around $3,000 to over $100,000.

The Micro-Sum monitor price of $2,995 includes a basic 8-element processor unit and CRT display, sensors, cabling, video output interface and operating controls.

Options can be added to the basic system with principal features of an expanded system including Boolean logic functions, up to 16 elements with 20 sensors and a tape cassette with playback capability, from 5530 Wisconsin Ave., 20015.

NCR Adds to Century 101 Series To Compete for System 3-Type User

DAYTON, Ohio – The NCR Century 101 computer series has been expanded – at the low end – to compete for IBM System 3, Univac 9200, Burroughs 1700 and Honeywell 105 and 115 users.

The basic 101 system consists of a new printer and disk subsystem configured with the standard 101 CPU, memory and card reader.

The printer (NCR 649-300) has a speed of 300 line/min across 132 columns. Columns are printed six lines to the inch with an option to allow printing at 8 line/verticle in., a spokesman stated.

The 656 disk unit is a single-spindle, dual-cartridge unit with one fixed and one removable disk. Each disk has a storage capacity of 4.9M characters – for a total storage capacity of 9.8M characters. Transfer rate is 312 kbyte/sec with an access rate of 47 msec, the spokesman said.

Internal memory for the Century 101 processor can be expanded from an initial 16K in increments of 8K to 32K, an then in 16K increments to 64K without increasing the size of the CPU. Cycle time is rated at 1.2 msec for 2 bytes, the spokesman added.

Users can increase disk storage by adding a single removable disk – enlarging external memory capacity to nearly 15M characters, or a dual-disk subsystem – one fixed and one removable – for a total storage capacity of nearly 20M characters.

The basic Century 101 is aimed at small or medium-size businesses which are first time computer users or which have small systems and want to upgrade.

Typical of prospective users, the spokesman stated, are financial institutions, hospitals, manufacturers, hotels and motels, educational institutions and government offices.

New printer and disk subsystem is configured with standard Century 101 CPU, memory and card reader.

The basic 101 system must be purchased or leased in its entirety and cannot be obtained as separate units.

Purchase price is $89,520 with a rental cost of $1,820/mo. The optional single removable disk add-on increases the rental by $320/mo, while the optional two-disk enhancement increases rental cost by $415/mo, the spokesman concluded.

Deliveries will commence in the third quarter of 1973.

Reader Gets Line Tracking

MIAMI – An auto line tracking feature, which performs all alignment functions for paper fed into the OCR unit, has been added to the 3001 Dataflow Page Reader, from Datatype Corp.

The cost is $1,000 on new or modified units from 1050 N.W. 163rd Drive, 33169.

Users Get Interface For IBM 1800 Series

TUCSON, Ariz. – Bell Engineering has developed an interface for the IBM 1800 Series of computers that transfers control signals and 16 data bits from microcircuit or relay data sources.

The Model 275 features optically coupled isolation for elimination of ground loops, logic level conversion with adjustable noise immunity, plus adjustable time delays for generating process interrupts.

Data transfer from a source device can be initiated through a source device by generated interrupt or under program control.

Options include built-in status (LED) indicators, a diagnostic test panel and modified logic levels to interface with other computers and/or data sources, the firm stated.

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Mini Makers Move to Become End-User System Source

By Michael Weinstein
Of the CW Staff

With separate releases of new peripherals, Data General Corp. and General Automation Inc. are increasing efforts to appeal to customers as systems sources and not only as manufacturers of minicomputers.

The newest peripherals for use with Data General CPUs include two visual display terminals and a paper tape reader.

The 6010 visual display terminal has a 53-key keyboard, and operates in roll mode, with the text appearing at the bottom of the screen.

The 6012 terminal is an upgrade from the basic 6010, a firm spokesman said, and includes a movable cursor to assist editing from the screen. Other features include the roll, page and buffered modes of operation and a hardware protection feature to format the screen in data entry applications.

The page mode permits data to be edited by moving the cursor and the buffered mode permits editing before the data is transmitted to the computer, the spokesman said.

The paper tape reader is said to be plug-to-plug compatible with existing Data General tape readers and is a unidirectional unit that reads standard 8-channel paper tapes at 300 char./sec.

Price for the 6010 is $2,300 with the 6012 costing $2,700. The reader costs $1,150. The interface for the display terminals costs $200 and the paper tape reader control is priced at $850, from Southboro, Mass.

GA Units for SPC-16 Series

General Automation Inc.'s line printer, disk drive, combination line printer/card reader and combination paper tape reader/punch complete the peripheral line available to users of the SPC-16 series of minicomputers.

The low-speed line printer operates at 200 line/min with a standard Ascii 64-character subset across 132 columns, a spokesman said.

Printing density is 10 char./in. with optional spacing of six or eight lines per verticle inch. The paper feed uses pinfold sprockets to advance paper at a speed of 24 line/sec and incorporates an alarm to advise the user when paper reaches one inch from the bottom of the form, a firm spokesman said. Cost of the printer is $8,500.

Head per track disks come in two versions: 64-track disk providing 128K 16-bit word storage or a 128-track unit providing 256K 16-bit word storage.

Both units use one dedicated head per track for a random-access rate of 8.7 msec. Disk drives are priced at $8,000 for the 64-track and $9,300 for the 128-track model.

Four Speeds

The combination line printer/card reader is available with four speed combinations. The 3355 is a 600 line/min printer and a 1,000 card/min reader for $19,100. The 3356 is a 600 line/min printer and a 600 card/min reader for $18,300. The 3357 and 3358 incorporate a 600 line/min printer with a 400 and 300 card/min reader respectively. Cost for the 3357 is $17,000 while the 3358 sells for $16,400.

The paper tape read/punch combination with controller includes a 300 card/sec reader and a 75 card/sec punch with optional fan-fold paper-handling options at a basic cost of $4,500. Fan-fold option is another $300, from Anaheim, Calif.

Credit System Uses Microfiche

SANTA ANA, Calif. – A credit authorization system from Micrographic Technology Corp. uses the MTC Model 95 microfiche retrieval-display unit as the output device for a Computer-Output-Microfilm (COM) data base.

The system is designed for credit authorization and name-number look-up operations in department stores, the firm stated.

Quick History

The unit can retrieve and display one specific customer history in seven seconds by placing a cartridge into the model 95 and entering the customer account number from the keyboard, the company said.

Units are priced at less than $2,500 from 1815 S. Ritchey St., 92705.

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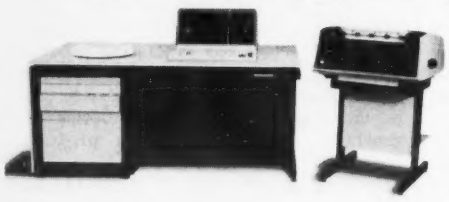

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COMPUTERWORLD
1972: The Year in Review
December 27, 1972 / January 3, 1973

1973 May See Showdown Of IBM Antitrust Suits

By E. Drake Lundell Jr.
Of the CW Staff

The antitrust suits against IBM picked up steam in 1972 and appear headed for a showdown in 1973 with the ultimate conclusion promising to affect computer users and the industry for years to come.

In the private arena, the Control Data suit continued to plod along with a trial date being set for November of 1973. Greyhound got knocked out of the box in its suit – the first to come to trial – but was quickly replaced by a new entrant, Telex Corp., which filed an antitrust action early in the year.

Now Hare This!

But the major action came in the Justice Department suit against the industry leader, with the previously tortoise-like Justice Department beginning to act like the hare.

Justice asked for the complete divestiture of IBM into "several discrete, separate, independent and competitively balanced entities capable of competing successfully in domestic and international markets with one another and with other domestic and foreign competitors."

At the same time, Justice asked that the divestiture action contain safeguards to ensure that present IBM computer users would continue to receive a high level of support during the transition to the multiple company concept.

While most of the suits were still in the pre-trial phase, one managed to come to court last year.

The Greyhound Computer Corp. case against IBM was not strong enough to be sent to the jury, a federal judge in Phoenix ruled, even before IBM had presented testimony in its defense.

The issues in the case were limited to the leasing sector, so the case cannot be considered as a precursor of other suits pending, sources indicated; the sources noted the case proves that other companies suing IBM will have to do their homework carefully if they expect any chance of success.

The ruling is being appealed, and 1973 will see some further action in this area – either a reopening of the case or its final conclusion if the appeals court agrees with the lower body.

Denting the Armor

The Control Data suit, which has been the most active since it was filed four years ago, is as broad as the one filed by Justice and also seeks a form of divestiture. The CDC lawyers have been poring over more than 27 million documents produced by IBM for their inspection under court order, looking for chinks in the IBM armor.

Late in the year, Judge Philip Neville, who is hearing the case in the Federal District Court in Minneapolis, ordered the parties to be ready for trial by November, after several earlier dates were ruled out by CDC and IBM.

It appears likely the case will come to trial, therefore, in 1973, and most likely will not be complete until 1974. Nevertheless, there is a good chance the CDC case will be the first to be resolved.

To replace Greyhound, Telex entered the lists last year, with a suit aimed at IBM's moves in the peripherals business.

Since this suit is limited to specific issues in the peripherals area, it appears now that the presiding judge will set a trial date for 1973, possible even before the CDC case goes to court.

Some sources have estimated the Telex action could be ordered for trial as early as June, but a fall date is regarded as more likely.

The big one, however, that is generating the most interest, is the Justice suit – and some early action appears likely in that case this year.

IBM has requested an early trial on the market definition issues alone for early 1973. This is seen by several legal observers as a move to sidestep the issues of IBM's practices in the marketplace.

Judge David Edelstein of the Southern District Court of New York is anxious to get on with the case, realizing it will probably set precedents for all future

(Continued on Page 19)

The Trends Tell the Story

For computer users, the significant news of 1972 came mostly in trends and in the continuation of earlier processes (lawsuits, etc.) rather than in specific events.

There was, of course, the June flood, which affected homes as well as businesses. And there was the IBM "blessing" to virtual storage, through its announcement of the 370/158 and 168.

But aside from these two instances, the computer community will be impacted by trends and processes discussed in these pages. Here, as seen by the Computerworld editors are those "headliners" in the approximate chronological order in which they occurred or were recognized.

- **Activity increases in IBM antitrust lawsuits.**
- **DOS/360 is "stabilized."**
- **Controversy surrounds add-on memories.**
- **Cobol standardization effort nears climax.**
- **Breach-of-contract suits continue unabated.**
- **Flood from Storm Agnes ravages businesses.**
- **IBM announces its version of virtual storage.**
- **Computer conferences respond to user needs.**
- **Privacy, social implications activity heightens.**
- **"Liberated" users get new savings opportunities.**
- **Computerized vote-counting runs smoothly.**
- **Software patent overturned.**

Lessons Are Learned

Users Have Their Trial by Flood

Computer users learned some invaluable lessons the hard way in June as flash floods spawned by Tropical Storm Agnes ripped into computer centers throughout the Middle Atlantic section of the U.S.

Out of the weariness that gripped many DP people after days of trying to clean up computer centers came the realization that in the future, height would be the best protection in possible flood areas.

State Guidelines

The desire to locate centers above potential high-water marks was evident thoughout the flood-stricken region, and the State of Pennsylvania began to draw up formal guidelines that would require state-run computer centers to be located on higher floors.

DPers in the flood region that ranged from Virginia to upstate New York put in superhuman efforts trying to reconstruct records and get their computer equipment – which was often the backbone of the financial systems of many companies – working without delay.

In many cases, it was a matter of putting their profession ahead of their own personal affairs. Programmers, managers and keypunch operators were often back to work in full force even while their houses and personal belongings had been lost to the flood waters.

In one case, DP personnel shuttled between their destroyed computer center in Harrisburg, Pa., and a quickly located back-up center in Washington, D.C., so that others hit as hard by floods would receive paychecks on time.

Innovation and patience marked much of the effort to recapture data and systems lost to the flooding.

The manufacturers proved to be a great help in this effort, both in locating back-up computer centers for temporary use by the ones affected and by rushing replacement systems to the area without delay.

In this day when more and more people rely on computers for the essentials in life – payrolls, financial records and hospital reports – the reaction of the DP people to this crisis was admirable.

DOS/360 User Finds That He Controls His Operating System

By Don Leavitt
Of the CW Staff

The year 1972 was one of transition for the DOS/360 user: he realized he had to stand on his own in planning the operating software he would use, just as he had always had to decide what application software should be installed.

The year got off to a poor start for many users with the IBM announcement that Release 26, distributed in December 1971, was a "functional stabilization" of DOS for the 360. Release 27, the company said, would not operate on the 360, but only on the newer 370 CPUs.

End of the Game?

Users thought this meant the end of support for DOS/360, but as 1972 wore on, the real meaning of the phrase "functional stabilization" became clearer, and by year end most users seemed fairly satisfied. They could stop playing "catch up" with IBM.

IBM isn't going to add any new features to DOS for the 360, but neither will it be putting out new releases – as it has in the past – that require a lot of work on the part of the user without any apparent compensating gain in throughput or operating ease.

Earlier DOS releases that required wholesale rewrites of Job Control Language (JCL) parameters, or recompilations of all programs using Indexed Sequential (Isam) files, have become part of the folklore of 360 installations, and users want no more of that.

User Now in Control

Though "functional stabilization" means IBM is dropping its development work on new features for DOS/360, the resourceful user sees things more positively. He realizes now that he, and not the hardware vendor, controls how and when the operating system will change.

He has begun to look more closely at DOS itself and at the many enhancement packages already available or being announced by independent software houses. It's safe to look at these packages now that there is no danger of IBM's putting out a DOS release that is either incompatible or redundant with what the independents offer.

The non-IBM sources provide an impressive array of features, all generally designed to provide support comparable to that of the IBM Operating System, without the immense core requirements of the larger control system.

The user saw that the dollar costs of the independent software might well be a reasonable trade-off for the unknown costs of conversion to OS on the 360, or

(Continued on Page 19)

The Shows Change And the Users Gain From New Approach

By Edward J. Bride
Of the CW Staff

Users change, and organizations that serve or sell to computer users must also change in order to be successful.

That lesson was learned by the "show" segment of the computer community in 1972, exemplified to some degree by the Joint Computer Conferences.

To make the conferences more meaningful to users, the sponsoring organization moved the meetings to major cities (centers of user population) and beefed up the technical program with user sessions.

The American Federation of Information Processing Societies (Afips) also changed the name of the conferences to the National Computer Conference and Exposition; the NCC will be an annual show, after the former JCCs had been run twice yearly for the past 20 years.

Also on the "show" scene, *Computerworld* became a factor, as the Computer Caravan was attended by more than 18,000 users in nine cities.

It became apparent that the caravan was more than "competition" for Afips, as 70% of the attendees had never attended a national conference.

The caravan also used a different approach to the technical program, with management-level computer users participating in panels and conducting workshops on operational problems, rather than expounding on the state of the art.

The Data Processing Management Association was one of the few non-Afips societies that conducted a conference with exhibits, a practice temporarily abandoned by some other groups.

The Association for Computing Machinery took a different approach to obtaining commercial support: the group rented rooms to software companies, which explained the various benefits of their products to invited customers.

The changing nature of these conferences was viewed by many people as a maturing of the organizations – as the industry had matured – and a realization that the very existence of a conference would not attract the buying public.

Lines Take Shape

1972 Was 'Virtually' Important Year for DP Products

Data Entry Options, Mainframes Popular

By Michael Weinstein
Of the CW Staff

That was the year in which the large mainframe builders filled out their product lines, the minicomputer makers tried to convert from suppliers of minis to systems suppliers and input-device firms took advantage of new technologies to offer users low-cost data entry options.

IBM established a commitment to "virtual memory" with the announcement of virtual storage capabilities for the 135 and 145 – at the same time introducing the 158 and 168 as virtual memory upgrades for the 155 and 165, respectively.

Two months later, the 370 Series was "filled out" with the unveiling of the 370/125 at the low end. A significant feature of the 125 brought all controllers inside the main box making it harder for users to attach peripherals from outside vendors and thus reinforcing IBM's position as a total system source.

Some conjecture has been raised on the possibility of a future announcement of a smaller 370 – for example, a 370/115. The gap between System/3 and a suitable 370 upgrade supports this view, some observers noted. Detracting from this view is that, with existing software, it seems unlikely that IBM can reduce real memory, and still support virtual operations.

The possibilities are a "System/4," a 370/115 without virtual memory or new software and/or firmware.

Other Machines

In May, Burroughs nearly doubled its number of medium-size computers with 13 models added to the 700 Series. This was followed one month later with what many experts consider the most significant release of the year: the B1700.

The small business-oriented B1700 offers virtual memory operations and makes use of micrologic to provide for variable word length – down to one bit – programming through interpreters instead of compilers, and solid state memory.

Honeywell unveiled the 2000 Series early in the year as an upgrade for 200 Series users. The 2000 machines included a communications front-end processor, visual control console, and disk subsystem.

Later in the year, Honeywell added to the 2000 and enhanced its Model 58 so it could play the role of a front end to larger systems.

NCR filled the gap between its Century 100 and Century 200 with the announcement of the Century 101. The 101 offered users 2-1/2 times the speed of the 100 and incorporated a disk subsystem and the ability to handle 256 communications lines.

Identity Problem

The mini builders continued efforts to break away from the role of OEM suppliers with the intent to supply end-user systems.

Much effort was put into building peripherals that operated with the small computers, and by mixing these peripherals, users could get turnkey-type systems.

By taking the basic mini mainframes, adding a few peripherals and software, companies were able to offer complete systems.

The area of data input was quite active with offerings centered around the concept of recording data at remote stations – either on internal memory or some storage media – for later transmission to the central CPU.

Microprogramming was used to create low-cost intelligent terminals capable of performing basic operations such as formatting and editing off-line.

The advantage to the user is that the central processor is left free until it can perform the more arduous computing tasks.

Another tack taken to free the CPU until data is ready was low-cost storage media devices. And in what seems to be a major fight for user support, the advent of floppy disks could be running head-on with the proponents of cassettes.

1972: Growth Year For Software Users

By Don Leavitt
Of the CW Staff

The year 1972 has to be considered a growth year for software.

IBM finally came out with virtual memory support, in effect "confirming" what several other vendors had been offering for many years.

Spectra 70 users found that RCA's dropping out of the business probably was the best thing that could have happened to them, as Univac came through with good strong updates of all the old RCA control software, including a Virtual Memory Operating System.

Announcement of the Burroughs B1700 was seen as potentially important, but users wanted to know how well the concept of a "universal host" machine worked for others, before they committed themselves to the admittedly impressive capabilities of the new machine.

Time-Sharing Matures

During the year, users began to look for means of backstopping or extending the capabilities of their in-house mainframes. Remote-computing networks, with a new maturity lost in the older phrase "time-sharing," introduced a variety of strong communications support systems, as well as improved centralized processing potential, for multi-location users.

Minicomputer makers and independent software houses announced the availability of control systems and packages to make the small machines more useful to the business-oriented end user. DEC introduced its Commercial Operating System.

Hewlett-Packard, Varian and Microdata all extended their support and near the end of the year a small software house in Kansas announced a software-only system that is said to provide virtual memory for the Data General Nova, and, with slight modification, for other minis as well.

Through all the vendor announcements and backed by the hard experience of getting through the economic crunch of 1970-71, users began to take a deeper interest in the basic tools of their trade. Performance evaluation packages, run-time analyzers and Cobol optimization techniques took on new significance, as did scheduling systems. Simulation possibilities were studied as they hadn't been before, particularly by the larger users.

And users became more concerned and more active in the area of standards.

Direct user interest, evidenced by letters and phone calls, has been credited with keeping Report Writer in Cobol, despite the objections of the language purists.

One hundred and fifty or more users have written to Control Data Corp. for copies of Marge Hill's handbook on *The World of EDP Standards,* and more than 1,200 have "subscribed" to the quarterly Codasyl newsletter, the very publication of which is a strong indication of user pressure to know more about what is going on in the hitherto mysterious halls of the standardization groups.

Virtual Storage a Liberator; Are Conversion Horrors at End?

Virtual storage effectively releases the programmer from undue concern about the size of his program, and lets him concentrate on the work to be done, regardless of how much "core" it requires. At the same time, the operations manager is relieved of many of his scheduling problems, as long as he can identify the priorities of jobs.

These freedoms are important, particularly as on-line data base management and inquiry systems grow. But the most important part of IBM's VS announcement last August may lie in a different area altogether: each of the three VS control programs is compatible with an existing version of OS or DOS.

Conversion Horrors

This means users can avoid the conversion horrors that previously marked changeovers from one operating system to another, such as upgrading from the 1400 Series to DOS/360, or even today, in moving effectively from DOS to OS.

Existing application programs would be "extremely compatible" with the VS sytems, IBM spokesmen said. Users have indicated even more success than that. They say there is no need to qualify compatibility: programs used in "real memory" systems run under VS without OS/VS1, used in the demonstrations of virtual storage, is an outgrowth of the recompilation or any other modification. "real memory" OS/MFT option. User test sites reported some problems but none serious enough to deter them from continuing use of VS.

OS/VS2 is a natural upgrade for the OS/MVT installation, and DOS/VS, scheduled for release next summer, will allow the DOS users on the smaller 370s to gain virtual capabilities.

Partitions Continued

IBM's approach to VS continues the use of partitions to structure the storage, and the use of priorities, available to user programs.

But during execution only active pages are brought into real memory. These are stored without regard to other active pages of the same program.

Paging under software supervision adds to both the amount of real memory and the time that must be devoted to control so there are tasks which tend to be degraded by being run in a VS environment.

OS/VS1 monitors the paging rate and suspends low-priority partitions until the more important jobs can be completed. Even the user whose system was too small, at 160K bytes, to support more than one partition in concurrent operation intended to stay with VS, since the virtual partition he could use was 192K bytes.

Competition Gives Data Users New Equipment and Services

By Ronald A. Frank
Of the CW Staff

Competition was the new watchword in communications during 1972. As AT&T and the Bell System slowly unveiled plans to compete with the independent suppliers and carriers, users discovered they had new alternatives in several areas relating directly to their computer/communications needs.

IBM reacted to the independent front-end suppliers by announcing its 3705 programmable front end for 360/370 users. Designed to upgrade the capabilities of 270X line controllers, the full capabilities of the 3705 should be realized in 1973 when the Network Control Program becomes available to provide message access and control capabilities.

Independents Move

But independent suppliers followed with their own versions. Both Prentice Electronics and PHI Computer Services offered equivalent systems along with Univac.

Users served by Rochester Telephone Corp. in New York began to use an interconnection coupler called a Network Protective Device (NPD) which was the basic element in a plan to simplify the connection of non-carrier equipment.

The Rochester plan was approved by the New York Public Service Commission (PSC), which proved to be one of the more progressive state regulatory bodies when it said interconnection had bred innovation and competition and was here to stay.

At year's end the commission was studying a complaint by the Independent Data Communications Manufacturers Association which claimed the Data Access Arrangement rates were too high and the units themselves were unnecessarily cumbersome.

One of the more innovative communications units came from Paradyne at the Fall Joint Computer Conference with its PIX system. Although limited to an RJE card/printer environment, the PIX system combined interface, modem and line controller into one package for 360/370 users.

The net result made the communications capability as simple as "an extension cord," according to one observer.

After holding a series of nationwide seminars for selected users, AT&T filed plans with the Federal Communications Commission for its Digital Data System scheduled to begin operations early in 1974. And a bulk rate plan was announced that would levy a dual-rate structure on private line users.

Following Microwave Communications Inc.'s (MCI) lead in providing service between Chicago and St. Louis, other specialized carriers moved to serve data users. Western Telecommunications planned to provide data channels under its long haul video facilities and several other carriers began constructing their systems. And Western Union got tentative approval to match MCI rates along the specialized carrier's first route.

After years of watching the Advanced Research Projects Agency network refine its resource-sharing concepts, several firms began to promote a commercial network to provide similar services. While no one was sure exactly how these nets would operate, the concept of interconnecting geographically scattered CPUs of differing types seemed to promise much.

Despite the slow progress of the FCC interconnection advisory committees in setting standards for the use of non-carrier equipment, the number of DAAs continued to rise. And despite the grim warnings of a damaged phone network, none of the existing carriers could produce instances of harm when requested to provide such data to the FCC.

Spotlight on User's Lib

IBM-Independent Battles Mean More Options for User

By Molly Upton
and E. Drake Lundell Jr.
Of the CW Staff

Users emerged from 1972 with more options, in more areas, as the independent manufacturers carried on their battle to offer the most price-competitive equipment.

Scarred by tightening budgets, users turned more than ever before to the various price-cutting ideas from the various manufacturers, as price/performance, cost comparisons and "more bang for the buck" became the slogans in DP shops across the country.

The major trend among the cost-conscious and liberated users centered around keeping the 360s operating as opposed to turning to the newer 370 gear from IBM.

This movement took several forms, including new lease plans, reduced 360 lease rates, add-on memory to make the 360s more cost effective and the introduction of advanced disk and tape equipment for the 360 line.

In addition, the lessors, after first bemoaning the new rent/price ratio on the 370, found they could in fact offer users price savings on 370 equipment, if users were willing to take independent peripherals as part of the deal.

In the fight to keep installed bases installed, the lease rates dropped drastically so by the end of the year the cry of two 360/50s for the price of one 370/145 was becoming familiar.

And with the addition of 3330-like devices, the 360/65 became an effective competitor with much of the 370 line, particularly with the 370/155 in many applications.

And there was a lot of activity in the 3330-compatible area, with most independents offering units compatible with the 360/65 and up even though IBM would only offer the disk system for the 360/85 and up.

One independent even put in a buffer in the controller for a 3330-like disk drive and offered the unit to users of the IBM 360/30, 40 and 50.

The unit, made by International Peripherals and Computer Corp. and marketed by Computer Investors Group, uses the buffer to slow down the transfer rate and make it compatible with the particular mainframe.

Lower Prices

In all cases, the independents managed to offer compatible 3330-like devices at prices that were under the umbrella price set by IBM – and the same applied in the tape area, where several manufacturers began to offer the 3420 tape drive at prices ranging from 10% to 20% off the IBM price.

Add-on memory for the 360 and 370 lines was also pushed by both the independent peripherals makers and the leasing companies, in an effort to remain cost-competitive with IBM.

Even though an IBM threat to withdraw CPU maintenance from systems with memory upgrades over the IBM limits scared off many users from taking advantage of this service, the brave ones were pleased with the results, often canceling upgrade plans.

The withdrawal threat also made many users realize there were third-party maintenance firms in the business who were glad to pick up the business dropped by IBM – and at a savings.

While the independent lessors fought hard to keep the 360 inventory in the field, they also found they could compete in the 370 area.

Several lessors found that by packaging independent memory with the 370 CPU from IBM they could offer the user great savings.

But the savings were time-dependent. For example, a packaged lease plan for a 370 with independent gear might save the user 25% if he signed up for a three-year period, but the savings could go much higher if he were willing to commit himself to as much as eight years.

IBM Antitrust Suits Head for Showdown

(Continued from Page 17)

antitrust actions.

He has been pushing both the government and IBM for quick action on the case, and even though it is unlikely he will accept the IBM motion for a trial on the market issues alone, it appears there will be some sort of trial in 1973.

Several sources believe that Justice cannot get ready for the entire case early this year, but that it might be able to take on at least part of the case.

DOS/360 Users Find They're on Their Own

(Continued from Page 17)

to installation of 370 gear.

Even the fear of "loss of support" for problems within DOS began to fade as 1972 passed. IBM had said, when Release 26 was made public, that normal centralized support would continue for Class A portions of DOS until March 31, 1973. Any problems formally reported by then would be resolved, and any coding changes would be distributed to all DOS/360 installations.

In any case, problems encountered after that date will still be fixed by IBM staffers – free if the solution has already been worked out for someone else; or, for a predefined hourly rate.

Many users have also begun to realize that even though IBM may claim the right to charge for systems engineer support related to DOS after April 1, 1973, there's a good chance much of this work will in fact be provided without cost, just because the local IBM office wants to keep the user happy.

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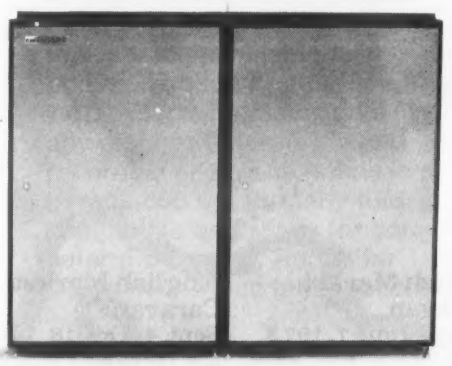

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Some Program Patents OK, But Trade Secrets Better

In a widely publicized 1972 decision, the Supreme Court struck down a software patent, casting uncertainty on the handful of existing software patents and on the chance for future patents.

Because of the complicated nature of the decision, CW asked attorney Roy N. Freed to assess its impact on users and on the industry. The following article was excerpted from a copyrighted paper.

By Roy N. Freed, Esq.
Special to Computerworld

Despite the Supreme Court's broad rejection in the Benson and Tabbot case of patenting as an appropriate legal measure to prevent unauthorized use or marketing of many types of computer programs, the software industry still must utilize some means to prevent commercial piracy of its valuable properties.

Other measures already have been identified and used for some time, especially reliance on rules barring misappropriation of trade secrets. If, as Justice William Douglas stated in his opinion, programs are deemed to be ideas and information, then the trade secret route for protecting ideas must be used primarily and with maximum effectiveness.

The rather flip characterization of programs as ideas must not be taken to mean that they may not be protected. We are quite accustomed to protecting ideas of various kinds from unauthorized use, as trade secrets and in other ways.

Since it appeared even prior to the Benson and Tabbot ruling that few software programs would be good candidates for patenting, either because of lack of inventiveness or the expense and delay involved in applying for a patent, the negative decision probably does not represent as great a blow as it might seem. The advisability of the trade secret approach simply is reinforced.

However, it seems more important than ever that the scenarios created by the licensing agreements and related business arrangements establish the groundwork for sympathetic judicial intervention where it is necessary to deter or seek redress for misappropriation of programs. Many existing license forms now in use do not provide a sufficiently sound legal basis for such enforcement.

What Is Software Program?

It seems that the Supreme Court, like many people in the industry itself, cannot yet conceptualize the real phenomena of software programs and automatic information processing by digital computer. Computers carry out information processing *processes* in the same way industrial processes are performed by machines under the direct guidance of people. Programs reflect the processes.

In this respect, it is essential to recognize the true nature of punched cards and magnetic tapes and disks. These input media serve as signal generating means. They cause specific sequences of electronic signals to be entered into the CPU. Those signals change the physical conditions of the internal memories of computers, thereby creating tailored electronic circuits, as distinguished from hardwired circuits not so readily alterable, but probably more easily patentable.

The new media either cause magnetized spots to be placed on surfaces of memory media or selectively magnetize memory cores. While the resulting changes in condition might, in some cases, be considered records of information on the new media, they represent physical elements that provide control and guidance of machines that process information automatically.

Justice Douglas apparently was not convinced of those facts, because he could not see in the processes carried out by means of computer programs the "transformation and reduction of an article [e.g., the internal memory, and hence essentially the entire CPU of which it is a part] to a different state or thing," a *sine qua non* for patentability of a process.

Engineering Effort

In the conceptualization effort, it should be recognized that programs are created by engineering effort, the initial result of which is the formulation of engineering design specifications. Industrial processes of the types admittedly patentable or treatable as trade secrets are created in the very same way.

The longstanding practice of characterizing activities involved in creating and using programs with such terms as "writing programs," "program libraries," and "coding" suggests to many people that programs are the result of literary efforts rather than engineering work. This also tends to suggest that programs are ideas in the sense used by Justice Douglas.

Moreover, computers are used with programs to carry out many industrial processes of the type that are either patentable or protectable as trade secrets.

The Benson-Tabbot decision corroborates the view generally held when the case was selected for Supreme Court review – that the program did not provide a good test case for software program patentability.

It well might be that the very basic nature of the method carried out by the program is too general and pervasive, while lacking in major inventive qualities, to justify a patent monopoly; the Court mentioned its many possible applications.

In light of Justice Douglas' careful disavowal of a denial of patentability to all digital computer software patents, it might have been preferable to base the decision on the more traditional and appropriate ground of absence of "invention."

Input Chief Vote-Count Problem

On election eve, programmers and computer operators hoped there would not be a recurrence of the type of vote-count disaster that happened in 1970.

When it was all over the next day, and more ballots had been counted in less time without any major system snafus, the people in charge declared the entire operation a glowing success.

While this initial reaction was correct on the system side there still were many problems on the input side, especially when punched cards were used.

Typical of the punched-card problems were those in Harris County, Texas, where election officials "just had to guess" which holes on the card the voter had intended to punch.

The pressures of counting votes late at night, combined with the large volume of votes, present a temptation to volunteers to simply brush chads off the cards without verifying whether the resultant card represents the voter's true choice.

One official observer in Oregon kept a personal record and found that in some precincts as much as 16% of the ballots had chads removed by officials.

The second major problem arising from using punched cards as the input medium this year was humidity which thickened cards so they were unreadable by the system.

In several places, humidity swelled the cards to the point where they had to be dried and shrunk to normal size before processing could continue.

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'Memory Problem' Partly Solved

By E. Drake Lundell Jr.
Of the CW Staff

"This is the first time I have ever stepped outside the fold, and since [IBM] reacted so strongly, I don't think I will ever go to independent equipment again, no matter how price-competitive."

This was the reaction of one user caught in the middle of the "Great Memory Controversy" that erupted in 1972 between IBM and the users of independently manufactured memory that extended 360 computers beyond the maximum limits available from IBM.

Shocking Announcement

Early in 1972, IBM shocked the user community as well as the suppliers of independent memory equipment with the announcement that it could not maintain central processors with such independent memory upgrades.

And even at year end, after the industry giant had been ordered to continue to offer at least "best effort" maintenance service to such users, many users were still afraid to turn to the independents for fear they would not receive adequate maintenance service.

360/30s First

The immediate cause for the action concerned 360/30s with either 96K or 128K of memory since IBM did not offer more than 64K for the systems, but many users thought IBM would not maintain any CPU with more than the IBM maximum amount of memory.

Even though IBM is required, under the 1956 Consent Decree, to maintain unaltered portions of its equipment that have independent equipment attached, the industry giant said it was "impractical" for its field engineers to maintain the CPUs with foreign memory attached, and "impracticality" is one loophole in the 1956 order.

Orders went from White Plains to several users ordering them to either restore the machines to the 64K size or turn elsewhere for maintenance services.

However, many of the users getting the notices were located outside of areas where third party maintenance firms were offering services – a move that some saw as intentional on the part of IBM.

The initial orders went out only to customers of Data Recall, but immediately the entire body of independent memory makers realized the threat wasn't limited to just one company and could spread to all of them.

IBM Pressure

Users also realized the move was a threat to their continued cost-effective use of 360 systems and that it signaled the beginning of IBM pressure to force them to upgrade to the newer 370 line, whether or not such a move was the most cost-effective.

However, Itel and Advanced Memory Systems entered the fray with a court case against IBM which eventually forced the firm to roll back its non-maintenance order.

Under a stipulated judgment entered in the Federal District Court in San Francisco, IBM agreed to continue to maintain CPUs with Itel-AMS memory beyond the IBM limits on a "best efforts" basis. Subsequently, IBM said it would also offer the "best efforts" deal to all memory manufacturers.

New Twist

During the squabble, most of the memory designers also added a new twist to their systems – a switch that allowed the IBM engineers to bypass the extra memory when diagnosing the system.

With the court case and the new design, the situation settled down, with IBM quickly approving add-on memories from most of the independent manufacturers for continued maintenance.

But the whole situation indicated the enormous power of IBM to scare off customers in the marketplace.

Change of Mind

Several users contemplating upgrading their 360 memory as opposed to getting a new 370 system changed their minds, afraid they would no longer be able to get adequate maintenance, no matter what the court agreement said, and even if they were not personally affected by the moves.

And what worried everyone – from users of independent gear to the suppliers – was that such a controversy could erupt again at any time, since the court order only really affected 360/30s with extended memory.

Committee Seeks Opinions On New Cobol Standard

By Don Leavitt
Of the CW Staff

The public comment period on a draft revision of the 1968 Cobol standard, completed in late summer by the American National Standards Institute (Ansi) technical committee X3J4, was stretched to next Feb. 13, because printing problems delayed production of the 600-page proposal.

The draft, described as a major revision of the old standard, includes a number of substantive changes – additions and deletions – as well as editorial and format changes to improve readability, according to X3 Secretary Robert Brown.

Under the new plan, there will be a nucleus and 11 "functional processing modules" in the complete Cobol standard, rather than the current nucleus and seven modules.

The current Random Access module is to be completely replaced by two new modules: Relative I/O and Indexed I/O. Additional facilities are provided by three new modules dealing with debugging, interprogram communications and communication between a program and its user.

Reflecting the results of a user fight with the Programming Languages Committee earlier in the year, the Report Writer feature is retained in the new standard. The feature has been completely rewritten, however, to remove ambiguities and to provide what its supporters feel is a stronger and more useful facility.

Copies of the proposed standard are available for $6 each from Brown at Computer and Business Equipment Manufacturers Association (CBema), 1828 L St., N.W., Washington, D.C., 20036.

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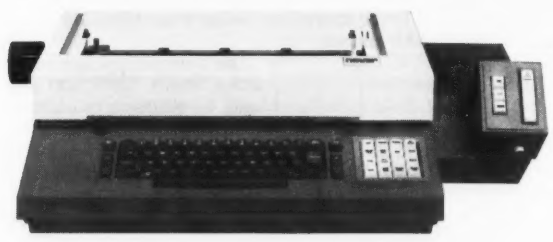

The Novar 5-50 and 5-60 terminals prepare both hard copies of business papers and tape copies of the information they contain. The data can be transmitted from tape in the batch mode at any time to a Novar 7-70 Data Collector which records the information on IBM computer compatible tape, ready for processing. It's an immediately available telecommunication system.

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Further information may be obtained from the application of the trustee dated November 28, 1972 filed with the Court or from counsel to the trustee, Messrs. Wachtell, Lipton, Rosen & Katz, 230 Park Avenue, New York, New York 10017. (212) 889-4300, Attention: Laurence D. Cherkis, Esq.

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Public Sector Shows Its Concern

Demonstrations and bombings have all but disappeared from the U.S. business scene.

Different manifestations of the social implications of computing have followed in their place.

A blue-ribbon committee was formed in 1972 by Elliot Richardson, Secretary of Health, Education and Welfare, who wanted to identify the possible negative effects of a universal identifying number, as balanced by the needs of computer users ' easy access to files of customers and/or clients.

Others Get Attention

While little public attention was paid to the HEW committee, the opposite was true of some other aspects of DP use. The Association for Computing Machinery (ACM) received front-page coverage of its ombudsman program. Prof. Alan Westin's National Academy of Sciences study into privacy was completed and published in book form, and pacifists continued to picket some computer companies concerned with the defense effort.

At year's end, the HEW committee had not compiled its report, but was studying the fruits of two other similar projects, the NAS study and another in Canada.

Danger to Privacy

In each case, it was suggested that a clear danger to privacy does exist and this is evident in the tendency of business and government to consolidate files, but such consolidation is not so widespread as is believed by some people. The citizenry received much of the blame for its unconcern about this problem. The reports also suggested computers can help protect – not just jeopardize – privacy.

Public Awareness

And the public is becoming more aware of computers, recent trends indicate. ACM started its ombudsman program about two years ago, and now about 25 chapters have volunteers trying to rectify computer-type problems.

While the ombudsmen do not generally seek publicity, a wire service recently distributed a story on an interview with Gordon Smith, executive director of ACM, and the "blame-the-computer" syndrome was the main topic.

Last year also saw members of the public taking computer users to court when systems were inflexible or when the users failed to correct computer-related errors.

In two cases, courts ruled that computer users are responsible for their systems, and for the output.

Insurance Battle

An insurance company customer who had let his policy lapse won a court battle, after being involved in an accident and after the company's computer erroneously informed him he had been covered.

In another insurance case, sloppy handling of input documents was ruled insufficient defense against another company which failed to issue a policy after payment was received.

With the public becoming more DP-wise, and with the consumer age bursting upon the scene, these cases were seen by observers as likely precedents for future public-interest lawsuits.

Contracts Clouded by Continuing Suits

Large and small users were active in breach of contract suits against their DP vendors in 1972.

A decision handed down by the U.S. District Court in Philadelphia, if taken as precedent, could make vendors distinctly uneasy about the gaps in standard contracts, which salesmen attempted to clarify.

The jury in the case of Carl Beasley Ford Inc. vs. Burroughs Corp. ruled that a salesman's oral promises were binding, at least where they are made in order to clarify vagueness or generalities in the contract.

In an out-of-court settlement of the giant of user-vendor lawsuits, Trans World Airlines and Burroughs agreed on terms of the $70 million suit filed two years ago by TWA.

Still pending is the suit filed by the International Chemical Workers Union (ICWU) against Singer Corp. and Systemation Inc., claiming that the System Ten installed "completely failed the needs" of the union because it allegedly had not performed "according to the allegations and promises made by representatives of either defendant."

The Ford agency was awarded a $56,000 settlement in the suit which focused on a promise by the Burroughs salesman of complete program development for the agency's E4000.

Burroughs filed a motion for a new trial.

TWA's suit charged that "misrepresentation and breach of contract" had rendered the airline's passenger reservation system useless.

Under terms of the settlement, TWA was absolved from paying its remaining balance of $11.5 million; the airline will have free access to Burroughs computers worth about $14 million in the next 10 years or can choose a $5.5 million cash payment instead.

Burroughs agreed to buy about $2 million worth of TWA software, which includes both reservations systems and control software, an airline official said.

Total settlement value was estimated at around $30 million.

The action filed against Singer seeks about $800,000 in damages. In addition to claiming the system didn't suit its needs, the ICWU charged Systemation, a software and consulting firm with recommending Singer, only to assure its continued employment.

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CI Notes

Data General Gets Own Core

SOUTHBORO, Mass. – Data General is the most recent mini maker to turn to an in-house facility for manufacture of core memories.

The firm, which had originally bought cores from RCA and later from EM&M after Digital Equipment Corp. took over the RCA facility for its in-house core operation, has invested over $500,000 in the new operation.

"We are producing cores at lower cost than the vendors who previously supplied us," according to Harvey Newquist, vice-president for manufacturing.

When DEC turned to in-house core production, it reduced memory prices, indicating the lower production costs made the reductions possible. Data General has not followed that lead yet, even though some observers indicated it might in the future.

Book Covers RFPs, Costs $200

SACRAMENTO – A 14,000-page book which sells for $200 and which will never make the best seller lists has been published by the State of California.

The book, in two volumes, is a request for proposals for the first of five consolidated data centers the state is planning.

The first center – business and services – is expected to cost around $10 million, depending on how well read the book is by seven qualified vendors.

G. Lee Smith, state data processing officer, said the two volumes describe hardware as well as 7,000 programs and 3,000 data bases to be converted.

Aussie DP Industry Growing

CANBERRA, Australia – Prospects for the Australian DP industry look brighter for 1973 than for the past few years.

A marketing manager in Sydney has predicted Federal Government spending will run at the $10 million-a-year level for the next three years.

Although the tenders were released during the outgoing Liberal-Country Party coalition government, the new Labor government is not expected to make any changes. Labor in fact is said to be more committed to GNP growth and productivity expansion than the previous administration.

Supershorts

Lorne K. Lodge has been elected president of IBM Canada Ltd., replacing William V. Moore who has resigned. Lodge has been a director of the company since 1968 and was previously vice-president for finance and administration.

– – –

A patent for the automatic Paging feature in its Delta 5000 and Telterm Series of video display terminals has been awarded to Delta Data Systems Corp.

– – –

Data General has announced plans for direct sales and service of its Nova minicomputer products in Australia.

– – –

Fabri-Tek has announced an agreement with Terminal Equipment Co. to represent Fabri-Tek in Japan.

– – –

Vermont Research Corp. has announced an agreement in principle to acquire OMI Memories, Inc.

– – –

Computek, Inc. announced that production has begun on its new line of graphics terminals, selling at $3,900.

– – –

Reproduction Systems Inc. has changed its name to Synergraphics.

– – –

Construction has started on the new home of the Vocal Interface Division of Federal Screw Works in Troy, Mich. The firm makes the Votrax Voice Synthesizer.

'It Was a Very Good Year. . .'

By E. Drake Lundell Jr.
Of the CW Staff

For the first time in several years, the computer industry ended its "season" in an upbeat mood with brighter visions expected to dance in the heads of most marketing men and industry prognosticators.

But while 1973 promised even bigger sugarplums to most industry figures, there were certain clouds on the horizon that could quickly turn the dream into a nightmare.

After a shaky first half, when the economic signs were mixed at best, 1972 picked up in almost all sectors.

After three laggard years, orders for new computer systems increased solidly in the year with the rise in order rates running around 25% on the average for both minis (up 50%) and larger units, according to International Data Corp., an industry research firm.

For the first time, too, the orders were up in the domestic marketplace (30%) as well as overseas (20%), where the high order rate had been holding up well during the U.S. recession of the past few years.

Many firms that previously had to depend on their overseas business in order to report increased profits also found the domestic scene helped bolster earnings during 1972.

But even while the U.S. market was better during 1972 than in the previous two years, the importance of the international marketplace could not be overlooked.

Also during the year, Honeywell was finally able to digest its take-over of the GE computer operation and Univac came to the rescue of the stranded RCA computer customers who were left holding the bag when RCA dropped out in 1971.

Both of these moves are seen as strengthening the mainframe industry, because there is now a relatively stable base of competitors to contend with IBM.

But the necessity for the take-overs worries some sources, who wonder whether the remaining firms will be better able than GE and RCA to compete with IBM.

In the peripherals area most of the firms reported coming off very bad years and showed improved earnings in spite of the rules of the Accounting Principles Board which make it harder to show a profit in a lease-based business like data processing.

(Continued on Page 24)

Firms Showing Profits, Too

T/S Services Flourish, Users Happy

By a CW Staff Writer

MOORESTOWN, N.J. – Time-sharing services have survived the economic crunch that started in 1969 with more than 100 such services operating and "a goodly number of them are now showing profits on their time-sharing operations."

At the same time, there is now "a high degree" of user satisfaction with such services, according to a report from Datapro Research Corp., a computer industry research firm here.

"Total revenues for on-line data processing services including both interactive time-sharing and remote batch processing, rose from just $20 million in 1966 to an estimated $400 million in 1971 and $540 million in 1972," the firm reported.

"This figure is expected to grow to approximately $1.4 billion by 1975," according to the report, "All About Computer Time-Sharing Services."

GE Ranks First

The leading supplier in the time-sharing services market is presently GE, "which entered the business in 1965 and has invested over $150 million in developing an international network that serves the U.S., Canada and Western Europe," the report stated.

In the future, the report continued, the number of users and applications available from the time-sharing services will "increase dramatically."

"There will be several large, nationwide suppliers of time-sharing services," or true information utilities in existence offering a broad range of services nationwide, Datapro noted.

The "smaller time-sharing companies that survive will generally do so by offering highly specialized services to specific types of business firms," Datapro added. "Companies attempting to market plain 'computing power' will find it increasingly difficult to stay alive," the firm warned.

Another trend, Datapro said, is that many current users of time-sharing services will turn to some type of in-house systems to meet at least part of their computing needs.

"Some companies will install small computers (such as the IBM System/3 Model 6 or the proliferating minicomputers) to replace individual time-sharing terminals, while others will install full-barreled in-house time-sharing systems of their own.

"To make up for these lost customers and maintain their growth, the time-sharing suppliers will have to keep on attracting new customers, primarily from the huge ranks of small business firms," the report indicated.

At the same time, Datapro predicted that in the future time-sharing users will have an ever-growing variety of packaged application programs to chose from, either developed by independent software houses or the time-sharing firms themselves.

Riding 'Piggyback'

"Piggy-backing of specialized services on existing time-sharing networks will become much more common," the study reported.

"Finally," Datapro said, "both suppliers and users will begin to take advantage of the fact that the nationwide time-sharing networks can be used effectively for a broad range of communications functions.

"The same time-sharing system that satisfies a company's computational needs and holds its data files will also be able to handle its message transmission, data collection, report distribution and other communications requirements," the firm said.

Pricing Complex

Presently one of the most confusing things about the time-sharing services is their pricing schemes, the report indicated.

"There has been no general agreement to date as to the best technique for accounting and charging for the system resources used by each customer.

"As a result, prospective users are confronted by a bewildering array of rate schedules," and this confusion makes "cost comparisons very difficult and accentuates the desirability of benchmark testing," the firm said.

Computer Exports Show Gains; Western Europe Largest Buyer

WASHINGTON, D.C. – U.S. exports of computer equipment ran at the $99.8 million level during October, up from the 93.7 million during September, but off from the $101.6 million figure registered during October 1971.

But even though October shipments were off slightly when compared with the year-earlier period, the total shipments through that month reached $956.4 million during 1972, up from the $928.1 million for the first 10 months of 1971, the Department of Commerce's Bureau of the Census reported.

Most of the shipments went to Western Europe, continuing the trend of the past year.

In all, equipment valued at $552 million was shipped to this area, with $360.1 million going to member countries of the European Economic Community and $101.8 million worth of equipment shipped to the UK.

The other countries in the old European Free Trade Association, took equipment valued $72.4 million and other areas in Europe imported equipment worth $7.5 million during the month.

Shipments to communist areas in Europe totaled $6 million, the bureau reported.

Canadian Market Healthy

The Canadian market continued to hold up well during October, with shipments worth $123.1 million going to this area, making it number two behind the European market.

The Japanese market was close behind Canada, with shipments worth $113 million imported from the U.S. during the month.

Latin America followed next as the most popular market for U.S.-made equipment, receiving a total of $44.2 million worth. Of this, $43.7 million worth went to the countries that are members of the Latin American Free Trade Association, the bureau said.

On-Line Computer Systems Seen Catching Batch Units, Parity Predicted for 1979

ANAHEIM, Calif. – The concept of remote computing – having a centrally located computer accessed from terminals over phone lines – appears to be gaining acceptance, based on the comparison of systems shipped that were batch processing-oriented with those shipped that were designed for on-line operations, according to M. J. Tobias of Honeywell Information Systems Inc.

In 1966, 86% of all systems ordered were of the batch variety and only 14% could be used for on-line applications. Today this figure stands at 70% batch and 30% on-line with predicted parity for 50% batch, 50% interactive for 1979, according to Tobias.

One of the major factors causing the increase in interactive systems, Tobias feels, is population mobility.

1973 Looks Even Better

Industry Outlook Shows Improvement in All Sections

(Continued from Page 23)

The tape and disk makers announced new products to compete with the new range of IBM peripherals and at first glance appear to be able to hold their own against the IBM units, but 1973 will be the big test in this marketplace.

Ominous signs appeared, however, for the tape and disk makers as IBM integrated the controllers on new mainframes introduced during the year, indicating the independents will have less gear eligible for replacement in the future.

And several sources indicated the big replacement money was in the controllers, and that replacing just the disk or tape drives might not be that practical for the independents.

There also continued a movement away from direct replacement of IBM gear with compatible equipment and a move toward offering a user a piece of equipment with more capability than the replaced IBM gear.

Several sources in the business believe this is the only avenue open to the independent who wishes to succeed.

"We've got to offer better products at essentially the same price or for a little less," is how one of the marketing men for an independent puts it.

But all of the independents agree that if IBM's movement to integration is carried to its extreme, then it may well spell doom for their products – or at least for their profit margins.

Remember This

The independent memory makers bore the brunt of the IBM moves against the independents during the year, having to fight a court battle to get an IBM pledge to maintain CPUs with their products attached.

But after the dust cleared, this segment of the market also continued to grow, supplying the users' needs for products that made their 360s more competitive on a price/performance basis with the newer 370s.

But most of the firms in the memory business also reported some slowing in the projected order rates for new equipment due to the IBM threat to withdraw maintenance.

Particularly in the volatile European market, the memory firms reported users were becoming leery of independent equipment due to the IBM pressures.

In all, though, the memory makers did well with the 360 line and announced plans to enter the 370 add-on and replacement memory market, with a particularly large market seen in the 155 and 165 area for those customers who do not wish to upgrade to 158s and 168s.

The memory makers had a close ally in this area in the form of the leasing companies, which had the largest stake in keeping the 360 cost-competitive in order to keep their 360 inventory in the field.

The rates for leased systems also dropped during the year, providing a break to users, and also helping keep the inventory in the field.

The leasing firms found they could also compete in the IBM 370 marketplace by offering mixed systems made up of independent memory and peripherals on a long-term basis, proving the financial resiliency of this industry segment.

But trouble could loom for the lessors, who will be hard pressed to maintain their 360 equipment in the field as the 370 becomes more and more price-competitive.

Since most of the firms have to keep the equipment out for at least five more years to get their investment back, it appears there will be some significant moves in the next two years in improving the price/performance of the 360 beyond present limits.

Closing the Gap

In the data entry side of the business, the gap between OCR and key entry began to close, with several manufacturers offering systems which combined the advantages of each technology, a trend that is expected to continue into 1973.

Many sources still expect a shakeout, however, in the data entry business, which will probably be evidenced by mergers between firms, such as the deal announced at year end between Inforex and Scan Data.

The software industry also showed signs of revival during the year, but on a lesser scale than in the heyday of this sub-industry.

Many software houses reported profits or at least lower losses than in the past few years, but most of those profitable firms had retrenched so they were essentially sticking to the areas where they knew they could do well instead of extending their resources into many different areas.

The biggest question mark for the industry remains: the possibility of future IBM actions.

Both the memory producers and the independent peripherals firms learned during the year that IBM actions could significantly impact their business and wondered what the new year would bring.

The data entry people also have the same worry, since IBM is marketing a new data entry unit in Europe and there remains a possibility the firm will bring the same or similar device to the U.S.

Some IBM 360 users have chosen to upgrade their existing systems rather than jump into a 370. Many others still face this important decision. And if you're in that position, our January 31st Supplement will be a big help.

Supplement Editor Ron Frank has talked to users who have upgraded, and he'll report on their experiences and problems. Cost factors will be analyzed, and there will be a survey of the various tools now available for upgrading a 360, including:

- Independent main memories
- Faster peripherals
- D.A.T. Boxes
- Independent software

If you're a 360-user, you'll find a lot to think about in this supplement. And if you have a product or service which can up a 360, you should be advertising in this special supplement. Your Computerworld representative can give you all the details. Or call Judy Milford at (617) 332-5606.

On January 31st, Computerworld shows "How to upgrade your 360."

IBM 'Iron Curtain' Lifting In Disk Market: Calcomp

ANAHEIM, Calif. – Calcomp can "coexist with IBM" in the disk memory sector of the computer peripherals industry, Calcomp President Lester Kilpatrick assured stockholders at the firm's recent annual meeting here.

"The iron curtain surrounding IBM as the dominant supplier of disk drives has been penetrated by independent suppliers," he said, adding, "Calcomp can coexist with IBM and continue to grow on the market share available to independent producers."

Calcomp's position in the OEM market, where it sells to such firms as Burroughs and Univac, gives it "a broad production base permitting Calcomp to achieve competitive costs and competitive prices in the end-user market," he told the stockholders.

OEM sales, he said, will be around $24 million in fiscal 1973 out of total revenues of around $73 million.

The firm's position in the graphics field continues to account for around 35% of the firm's revenues and plotting equipment is growing at an annual rate of around 20% yearly, he added.

$725 Telex Cassette System Can Replace Punch Units

MINNEAPOLIS – The Termi-138E, a digital cassette memory subsystem designed to replace paper tape reader/punch units, has been developed by the Telex Communications Division.

The Termi-138E operates at switch-selectable rates of 10-, 15- or 30 char./sec. An EIA RS-232-C data interface is provided and single or multiple ports are available. Incremental operation is at 30 step/sec, with fast forward/reverse at 330 char./sec.

The unit features editing capability and control via data-encoded commands.

In quantities of 100, the Termi-138E sells for $725 each from 9600 Aldrich Ave. S., 55420.

Core Has 20-Bit Word

MARINA DEL REY, Calif. – A modular core memory with 20-bit word size and a full cycle time of 650 nsec has been developed by Ampex Corp.

The 2065 may be expanded modularly from 8K to 64K words of 20 bits each, or up to 32K words of 40 bits each.

The 2065 is based on the 1800 Series and costs less than 15 cent/bit in quantity. Delivery is 60 days from 13031 W. Jefferson Blvd., 90291.

Micro-Ram 3000 Produced

HAWTHORNE, Calif. – The Micro-Ram 3000, a complete 8K by 20 semiconductor memory system on a single card with an 180 nsec cycle time, has been unveiled by Electronic Memories.

With an access time of 200 nsec, the Micro-Ram 3000 can be used to enhance equipment currently using the Micromemory 3000, an 8K by 18 core memory.

The Micro-Ram 3000, priced at $4,800 in quantity, is available from 12621 Chadron Ave.

Other OEM Products

Memorex Corp. has announced the 651 Flexible Disk File, an enhanced version of the Memorex 650, with track-to-track access time of 10 msec with 10 msec settle time. Average latency time is 80 msec.

The 651 will be available with the new FD/IV Flexible Disk Cartridge that gives a minimum of 50 million passes, evenly distributed, and dual 60/50 Hz operation, the firm said.

Available in production quantities in the second quarter, prices start at $750 per 651 unit and $6.50 per FD/IV from San Tomas at Central Expressway, 95052.

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Intel Corp., Santa Clara, has introduced a set of Proms and TTY tapes that enable an MCS-8 microcomputer prototype to assemble programs for itself, translating symbolic assembly language into MCS-8 machine language.

When the Proms are plugged into an SIM8 prototyping board and the tape is read into the RAMs on the board, the prototype is ready to perform the functions of a Fortran IV assembler run on a conventional computer.

Assembly program on eight Proms plus one tape costs $648, while assembly program on tapes only costs $200 from 3065 Bowers Ave., 95051.

– – –

The ruggedized MK-28M keyboard from Data Electronics Corp., Burlington, Mass., is currently being delivered with 2-key rollover and data interlock features. N-key rollover can be ordered as an option.

The keyboard uses a standard 5-level Baudot code. Optional codes include Fieldata and Ascii.

– – –

A "roll your own" modem capable of operating to 600 baud has been introduced by the Data Products Division of OPT Industries, Inc., Phillipsburg, N.J.

The 1030 Series modems, which are end-to-end compatible with the Bell 103 family of data sets, are contained on a single printed circuit card assembly with signal accessibility via card edge connector. The number of pins, designated outputs and size of the card may be determined by the user. The major functions are assembled in modules and frequencies, speeds and interfaces can be changed in the field.

New OEM Products

Four standard interfaces are offered: EIA RS-232 B/C, Teletype, CCITT and DTL/TTL.

A complete card sells for $95 in OEM quantities from 300 Red School Lane, 08865.

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The Series 555 solid-state keyboard available with a choice of five standard roll over features has been announced by Licon, Division Illinois Tool Works, Inc., Chicago. The LSI allows programming of any number of functions that a customer requires, the firm said.

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A disk pack recording head designed for the updating of 2314 systems to 3330 capability has been introduced by Information Magnetics Corp.

The Model R 4400-NT read/write head writes at 200 track/in., with a recording density of 4,400 bit/in. The unit has the same flying height as conventional 2314 heads.

– – –

The Matrix Systems Corp., Chatsworth, Calif., has announced the Model 5000 Programmable Controller designed specifically to control Matrix's line of programmable coaxial and low-frequency switching systems.

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Data Processing Digest, October 1972.

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Iomec Purchase Plan Allows Intermixing

SANTA CLARA, Calif. – Iomec is offering a new purchasing plan to OEMs that allows them to intermix peripherals to get quantity discounts, plus a beefed-up service and support program.

Under the purchase plan, if an OEM orders 50 disk drives and 50 tape drives, for example, he will be eligible for the 100-unit price on each since the total order is for 100 units.

The Peripheral Package Purchase Plan will affect the firm's six different electro-mechanical peripheral lines: magnetic tape drives, mini-cartridge tape drives, large and small cartridge disk drives, and a paper tape line including readers, punches, and handlers and line printers.

Almost all OEM vendors offer discounts to large quantity purchasers on units in a single product line, in effect passing on the savings in selling cost to the purchaser, since the selling costs for 100 units, for example, is not that much greater than for 10 units, the firm explained.

In addition to the purchase price savings, the plan should also help reduce the cost to the purchaser in time spent on contracting for equipment, Avery Blake, marketing vice-president pointed out.

"A firm will only have to deal with one vendor for an entire range of peripherals instead of with several," he said, "which should save it considerable costs in evaluation and contracting."

Support and Service

The beefed-up support and service program includes the design of interfaces to enable OEMs to interface the peripheral equipment to their specific minicomputers, Blake noted, adding that the service should be particularly beneficial to systems houses.

"Multiple peripheral vendors, various types of interfaces, noncompatible software, and narrowly trained service technicians" cause problems for systems houses, both in their own facilities and in their end-user locations, he noted.

To overcome this problem, Iomec is offering interfaces and software support systems designed to common standards in order to provide complete compatibility of all peripherals, he said.

In addition, it is offering field service contracts not only for its own equipment, but for complete systems, even systems that include non-Iomec peripherals.

The Iomec Customer Engineering Department will provide service for the entire system built by the OEM, whether it is in the OEM's shop or in an end-user location, he stated.

The maintenance service for minicomputer systems will also be offered directly to end users on a contract basis, he said, allowing the end user with a mini and peripherals from several sources to get service from one source for the entire system.

Executive Corner

MINNEAPOLIS – Fabri-tek has promoted two executives in both the end user and OEM sides of its marketing organization.

Ken Geason, formerly national sales manager for end user products, became director of end user marketing, while Gerry W. Larsen, formerly national sales manager for OEM core memory products, was promoted to director of OEM marketing operations.

Other Moves

■ James P. Scheer was named general manager of data management systems for the Products and Systems Division of Lockheed Electronics. Scheer was formerly Northeast regional manager for Mohawk Data Sciences.

■ Michael Kaminsky Jr., formerly a division vice-president of operations at Norden Division of United Aircraft Corp., has joined Sanders Associates as corporate director of manufacturing.

■ William R. Roach, previously with Paul Hardeman Engineers and Constructors, has moved to Optimum Systems as vice-president of finance. He was also named corporate secretary.

■ Philippe Yaconelli, founder of Caelus Memories and previously president of his own development firm, has re-joined Memorex in the new position of general manager of the business products group.

■ Norman M. Lourie moved to Cambridge Memories as vice-president and group product line manager for end user products.

■ Time Data appointed two regional sales managers: Richard E. North in the Western region and David D. Arnold in the Southwest region.

■ James S. Rice was appointed president of Data Technology Corp.

■ Thomas E. Scholten has been appointed president of CFI Memories, Inc.

■ John C. Lewis is now vice-president, marketing for Xerox Computer Services.

■ Robert L. Reis has joined Capidyne Systems Corp. as vice-president, marketing.

■ John H. Ward was named vice-president, business products operations at Control Data Corp.

■ James G. Turner has been named general manager and chief operating officer of Data Recall Corp.

■ Frank H. Tyaack has been appointed general manager of the process equipment and systems division of Westinghouse Electric Corp.

■ Arthur Blumenfield has been named a vice-president of OEI Computer Systems Division of Vernitron Corp.

■ Paul J. Fimett has been appointed director of scientific systems at Informatics Inc., Western Division.

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Hewlett-Packard, General Automation, Varian Report Improved Earnings

Three West Coast mini makers – Hewlett-Packard, Varian and General Automation – have all reported better results for recent financial periods.

General Automation, Inc. in Anaheim, Calif., had a record-setting first quarter ended Oct. 31, with revenues totaling $5.9 million and earnings before extraordinary credits reaching $389,000 or 19 cents a share.

The company's backlog rose to $8.2 million, an increase of almost 200% from $2.8 million in the same quarter last year.

"Sales grew steadily for our SPC-12 and SPC-16 families of minicomputers, while they doubled for our System 18/30 line and quadrupled for our 18/30-based Disk Monitor Systems," observed President Lawrence A. Goshorn.

Response has been "greater than anticipated" to the firm's Adapt-A-Path production control units, he added.

With a $355,800 or 15 cents a share tax credit, first quarter earnings rose to $725,000 or 34 cents a share.

In the same quarter last year, revenues totaled $2.9 million with earnings of $104,000.

Good Year at H-P

The year 1972 was "an extremely good one" for Hewlett-Packard in Palo Alto, Calif., with virtually all operating divisions reporting a "higher level of business," observed President Wiliam R. Hewlett.

"Incoming orders amounted to $506.9 million, up 28% over orders of $397.5 million in fiscal 1971," he noted.

For the year ended Oct. 31, the firm reported a 26% increase in sales and a 57% increase in earnings.

"Our domestic markets were particularly strong, with orders from U.S. customers rising 32% to $307.2 million. International orders were up 22% to $199.7 million," he said.

Revenues rose to $472.4 million from $375.1 million last year. Earnings, including a $1.2 million or 5 cent a share extraordinary gain from a change in valuing inventories, totaled $37.6 million or $1.42 a share, up from the $23.9 million or 92 cents a share in the preceding year.

Varian Emerges

Varian Associates, also in Palo Alto, emerged from last year's loss of $6.7 million to earnings of $3.7 million in the year ended Sept. 30.

"Our markets are returning to more normal levels and together with improvements in operations are resulting in increased profits," observed President Norman Parker.

In the fourth quarter, earnings totaled $1.7 million or 23 cents a share compared with $603,000 or 9 cents a share a year ago. Revenues rose to $53.3 million from $49.2 million.

In the year, earnings, including a special credit of $258,000 or 4 cents a share, totaled $3.7 million or 52 cents a share, compared with last year's loss of $6.7 million, including a $2.5 million special charge. Revenues rose to $203.8 million from $187.2 million.

Continuing Operations Seen Boosting EM&M

LOS ANGELES – Trude C. Taylor, president of Electronic Memories and Magnetics Corp., is expecting Santa to leave a present of over $1.5 million from continuing operations in the year ending Dec. 25.

There may also be a slight profit from discontinued operations, and some hefty credits from the sale of Electroglas Inc. and tax loss carryforwards, he said.

EM&M expects about two-thirds of its estimated $74 million in sales this year to come from its memory products group, and the rest from Indiana General group, which makes magnets and ferrites.

Taylor predicted growth from a new line of core memory and disk memory systems currently in production and said he sees "continuing growth in demand" for core memories at "satisfactory profit margins."

The firm's entrance in 1972 into the end user market, with its engineering, marketing and start-up costs, "resulted in about a $2 million loss," Taylor said, but added "end user operations are expected to show a positive contribution in 1973 and quarter-to-quarter improvement."

In fiscal 1971, EM&M's earnings of $2 million from continuing operations dissolved into a loss of $8.5 million after a $908,000 loss from discontinued operations and special charges totaling $9.6 million.

Taylor said fourth quarter earnings this year will better the third quarter net of $1 million, and he sees substantial improvements in operations in fiscal 1973.

"The computer industry is coming back to life. It was still depressed on the manufacturing level in 1971 and early in 1972," he said.

He expects the industry's "up" cycle to continue through 1974, he said.

Nickels & Dimes

Itel has obtained a $7.5 million line of credit from the Bank of America for a subsidiary of the Itel Finance Corp. Funds will be available through August 1973 at the prime rate and will enable Itel to finance full payout lease receivables associated with its 370 packaged lease program.

$$$

Memorex has signed an agreement with First National City Bank for a $5 million revolving line of credit to finance leasing of Memorex computers and equipment abroad. Memorex expects this amount will be fully used by the end of the first quarter of 1973.

$$$

Control Data's computer operations were solidly in the black for the fourth quarter although possibly not "quite at the level" of the third quarter, and CDC is looking for earnings increases in 1972 and 1973.

$$$

Commerce Group's DP leasing volume increased 63% in the first half of fiscal '72, but an accelerated depreciation rate held second quarter earnings to 12 cents a share. Commerce recently acquired the computer leasing business of NCC Industries, N.Y.

$$$

Leasco has declared a quarterly dividend of 10 cents per share payable on Jan. 15 to shareholders of record Dec. 15.

$$$

Central Data Systems has announced a 7 cents per share year-end dividend to be paid Dec. 29 to shareholders of record Dec. 19.

$$$

Name Change: Computer Terminal is now **Datapoint**. Stockholders also voted to increase the authorized number of common stock from six million shares to 10 million shares.

$$$

Revenues, writedowns and soft demand and price erosion for used computers were cited as primary reasons for the $1 million loss at **The Computer Exchange** for the year ended June 30, but the first quarter improved, with earnings of $33,794. Backlog as of Sept. 30 exceeded $1 million.

$$$

Advanced Computer Techniques showed a turnaround from a six-month loss of $48,134 to earnings of $51,407 in the period ended Sept. 30, on a 40% rise in revenue.

$$$

Greyhound Computer shareholders were awarded a year-end dividend of 20 cents a share on Dec. 15.

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JAN. 19TH AVAILABILITY--ACT NOW

Qty.	Model/Feature	Serial No.	Qty.	Model/Feature	Serial No.
1	2030-F (64K-1.5 mic.) 3237, 3895, 4456 4464, 4465, 4466 4468, 4760, 5856 6960, 7520, 7915	No. 19541	1	2821-1 3615, 5895 9262	No. 17061
1	1051-N1 3130, 4409, 4410 4411, 9708, 9884	No. 55972	1	2401-2 (9 Tr.) 9053, 9558	No. 27808
1	1052-8 9571	No. 67264	1	2401-2 (9 Tr.) 9053, 9558	No. 27813
1	1403-N1	No. 37208	1	2803-1	No. 11300
1	1416 9613		1	2311-1 9121	No. 34643
1	2540-1 5890	No. 19736	1	2311-1 9122	No. 34644
			1	2311-1 9123	No. 34677
			1	2841-1	No. 35514

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Qty.	Model/Feature	Purch. Price
4	2401 3 (9 Tr.)	$6,500.00 ea.
2	2401 3 (7 Tr.)	4,000.00 ea.

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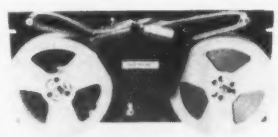

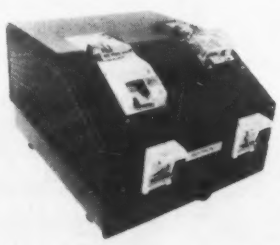

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TRADE*QUOTES®

Computerworld Stock Trading Summary

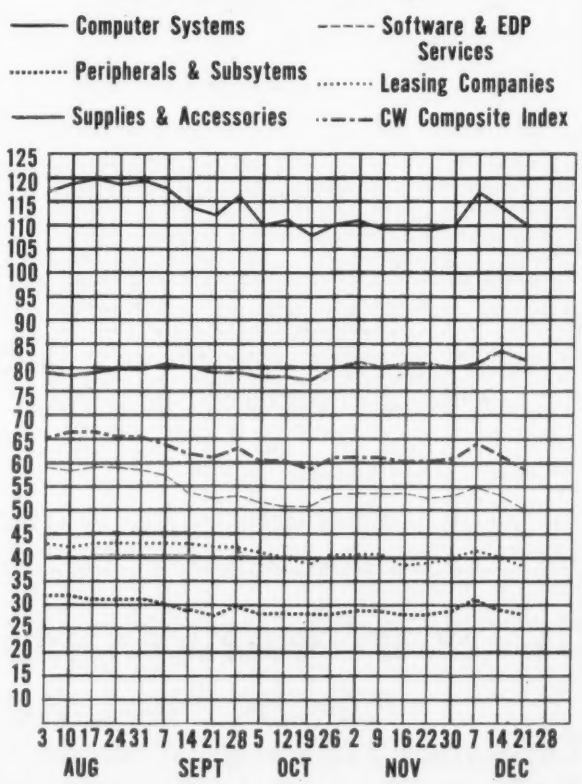
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, DECEMBER 21, 1972

EXCH		1972 RANGE (1)	CLOSE DEC 21 1972	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 3	1 7/8	- 1/4	-11.7
A	APPLIED DATA RES.	3- 7	3 3/8	- 5/8	-15.6
O	APPLIED LOGIC	1- 4	3	0	0.0
N	AUTOMATIC DATA PROC	72- 99	90 1/2	-4 3/8	-4.6
O	BRANDON APPLIED SYST	1- 2	1	0	0.0
O	COMPUTER DIMENSIONS	4- 14	3 3/4	- 3/4	-16.6
O	COMPUTER DYNAMICS	1- 4	1	- 1/4	-20.0
O	COMPUTER NETWORK	3- 7	3 3/4	- 1/4	-6.2
N	COMPUTER SCIENCES	4- 10	4 3/4	- 3/4	-13.6
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER TECHNOLOGY	3- 8	3 1/8	- 1/8	-3.8
O	COMPUTER USAGE	7- 14	9 3/8	+ 1/4	+2.7
N	COMPUTING & SOFTWARE	14- 28	14 1/4	-1 5/8	-10.2
O	COMRESS	1- 3	1 1/8	0	0.0
O	COMSHARE	5- 10	7 7/8	- 1/4	-3.0
O	DATATAB	4- 9	4	0	0.0
O	EDP RESOURCES	2- 8	2 3/4	0	0.0
A	ELECT COMP PROG	1- 5	1 3/4	+ 1/8	+7.6
N	ELECTRONIC DATA SYS.	43- 65	54 1/2	- 1/4	-0.4
O	INFORMATICS	5- 11	5	- 1/4	-4.7
O	I.O.A. DATA CORP	1- 3	3/8	- 1/4	-40.0
O	KEANE ASSOCIATES	4- 7	3 1/2	0	0.0
O	KEYDATA CORP	7- 13	10 3/4	- 1/4	-2.2
O	LOGICON	4- 9	4 1/2	- 3/8	-7.6
A	MANAGEMENT DATA	4- 10	4 3/4	0	0.0
O	NATIONAL CSS INC	8- 31	26 1/2	-2 3/8	-8.2
O	NATIONAL INFO SRVCS	2- 5	1 3/8	- 1/8	-8.3
P	ON LINE SYSTEMS INC	8- 29	24 1/4	+ 1/4	+1.0
N	PLANNING RESEARCH	6- 17	6 1/8	- 3/8	-5.7
O	PROGRAMMING METHODS	20- 25	24 1/2	-1	-3.9
O	PROGRAMMING & SYS	1- 2	1 1/8	- 1/8	-10.0
O	RAPIDATA INC	5- 27	24	-1 1/4	-4.9
O	SCIENTIFIC COMPUTERS	2- 4	1 5/8	- 1/8	-7.1
O	SIMPLICITY COMPUTER	1- 5	4 1/2	+ 3/4	+20.0
O	TBS COMPUTER CENTERS	3- 6	3 1/8	0	0.0
O	TCC INC	1- 3	1/2	- 1/8	-20.0
O	TYMSHARE INC	7- 11	9 1/4	- 1/8	-1.3
O	UNITED DATA CENTER	5- 8	6 1/4	+ 1/4	+4.1
N	UNIVERSITY COMPUTING	9- 26	10 3/4	- 3/8	-3.3
A	URS SYSTEMS	6- 10	7 1/2	- 5/8	-7.6
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	32- 49	32 1/8	-1 7/8	-5.5
O	ADVANCED MEMORY SYS	12- 23	14 1/2	- 1/2	-3.3
N	AMPEX CORP	5- 15	6	- 3/8	-5.8
O	ANDERSON JACOBSON	4- 8	4 1/4	- 1/8	-2.8
O	BEEHIVE MEDICAL ELEC	1- 8	6 3/8	- 1/2	-7.2
A	BOLT,BERANEK & NEW	5- 21	11 1/4	-1 1/4	-10.0
N	BUNKER-RAMO	9- 14	9 1/4	- 1/4	-2.6
A	CALCOMP	9- 25	10 3/4	-1	-8.5
O	CAMBRIDGE MEMORIES	9- 15	12 1/4	+ 1/4	+2.0
O	CENTRONICS DATA COMP	6- 28	19 1/2	-4	-17.0
O	CODEX CORP	6- 25	18 3/8	- 3/8	-2.0
O	COGNITRONICS	2- 5	2 1/2	- 1/4	-9.0
O	COMPUTER COMMUN.	1- 7	2 3/4	+ 1/4	+10.0
A	COMPUTER EQUIPMENT	2- 4	2 1/4	- 3/8	-14.2
O	COMPUTER MACHINERY	7- 13	9 1/8	- 1/2	-5.1
O	COMPUTER TRANSCEIVER	2- 9	5 3/8	- 3/8	-6.5
A	COMPUTEST	3- 9	4	0	0.0
N	CONRAC CORP	24- 39	30 1/2	-3 1/4	-9.6
A	DATA PRODUCTS CORP	3- 7	3 3/4	- 1/8	-3.2
O	DATA RECOGNITION	1- 5	1 1/4	0	0.0
O	DATA TECHNOLOGY	2- 5	2 1/4	- 1/8	-5.2
O	DI/AN CONTROLS	0- 8	4 1/8	- 1/4	-5.7
N	ELECTRONIC M & M	3- 8	4 7/8	- 1/4	-4.8
O	FABRI-TEK	2- 5	4	- 1/8	-3.0
O	GENERAL COMPUTER SYS	6- 16	6 3/4	+ 3/4	+12.5
N	GENERAL ELECTRIC	59- 70	68 3/8	- 1/8	-0.1
N	HAZELTINE CORP	7- 13	8 1/4	- 3/8	-4.3
O	INFOREX INC	20- 36	20 1/4	- 1/4	-1.2
O	INFORMATION DISPLAYS	1- 5	1 1/2	0	0.0
O	INFORMATION INTL INC	8- 25	12 3/4	- 1/2	-3.7
A	LUNDY ELECTRONICS	8- 14	8 1/8	0	0.0
O	MANAGEMENT ASSIST	1- 2	3/8	0	0.0
A	MILGO ELECTRONICS	15- 44	23 1/4	- 5/8	-2.6
N	MOHAWK DATA SCI	12- 27	11 5/8	-1 1/4	-9.7
O	ODEC COMPUTER SYST.	6- 12	5 1/2	- 1/4	-4.3
O	OPTICAL SCANNING	6- 16	5 1/2	- 1/2	-8.3
O	PERTEC CORP	8- 17	8 1/8	- 5/8	-7.1
O	PHOTON	6- 15	6 1/4	- 1/8	-1.9
A	POTTER INSTRUMENT	7- 21	8 5/8	- 3/4	-8.0
O	PRECISION INST.	3- 13	3 1/2	- 1/4	-6.6
O	RECOGNITION EQUIP	5- 15	7 3/8	-1	-11.9
N	SANDERS ASSOCIATES	13- 21	17 1/2	- 3/8	-2.0
O	SCAN DATA	5- 13	5 5/8	- 1/8	-2.1
O	STORAGE TECHNOLOGY	17- 39	27 5/8	-1 3/8	-4.7
O	SYCOR INC	7- 11	9	- 1/4	-2.7
O	TALLY CORP.	8- 15	10	- 1/8	-1.2
N	TEKTRONIX INC	34- 64	49	-1 1/2	-2.9
N	TELEX	6- 15	5 3/4	- 3/4	-11.5
O	WILTEK INC	10- 26	16 3/4	- 3/4	-4.2
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	5- 9	6	0	0.0
A	BARRY WRIGHT	9- 14	11 3/4	-1 5/8	-12.1
A	DATA DOCUMENTS	17- 26	21	-1 1/2	-6.6
O	DUPLEX PRODUCTS INC	8- 16	9 3/4	- 1/2	-4.8
N	ENNIS BUS. FORMS	6- 10	7 1/8	+ 1/8	+1.7
O	GRAHAM MAGNETICS	15- 27	14 1/2	+ 1/4	+1.7
O	GRAPHIC CONTROLS	11- 15	12 5/8	- 1/8	-0.9
N	3M COMPANY	76- 86	82	-3 3/8	-3.9
O	MOORE CORP LTD	42- 57	56 3/8	+ 7/8	+1.5
N	NASHUA CORP	48- 62	57 1/4	- 7/8	-1.5
O	REYNOLDS & REYNOLD	37- 77	45 3/4	-3 3/4	-7.5
O	STANDARD REGISTER	14- 20	18 1/8	+ 3/4	+4.3
O	TAB PRODUCTS CO	14- 23	22 1/2	+ 3/4	+3.4
N	UARCO	21- 28	22 1/2	- 7/8	-3.7
A	WABASH MAGNETICS	6- 11	6 3/4	- 1/8	-1.8
N	WALLACE BUS FORMS	21- 26	24 5/8	-1 3/8	-5.2
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	147-229	215 7/8	-9 1/8	-4.0
N	COLLINS RADIO	14- 27	23 1/8	- 1/2	-2.1
N	CONTROL DATA CORP	43- 78	58 3/4	-2 1/2	-4.0
O	DATA GENERAL CORP	56-115	110	0	0.0
O	DIGITAL COMP CONTROL	5- 25	5	- 1/4	-4.7
N	DIGITAL EQUIPMENT	72-101	90 1/4	-4 1/2	-4.7
N	ELECTRONIC ASSOC.	6- 13	7 7/8	- 7/8	-10.0
A	ELECTRONIC ENGINEER.	6- 14	8 1/4	- 3/8	-4.3
N	FOXBORO	23- 41	28 1/2	-2 3/8	-7.6
O	GENERAL AUTOMATION	13- 44	43 1/2	+4 3/4	+12.2
O	GRI COMPUTER CORP	2- 5	2 1/2	- 1/4	-9.0
N	HEWLETT-PACKARD CO	46- 81	81 1/4	+3 3/8	+4.3
N	HONEYWELL INC	118-170	130 3/8	-2 7/8	-2.1
N	IBM	333-426	385 1/2	-10	-2.5
O	...ERDATA INC	8- 16	9 5/8	0	0.0
N	MEMOREX	15- 38	17 1/8	-1 5/8	-8.6
O	MICRODATA CORP	5- 10	8 1/4	+ 1/8	+1.5
N	NCR	29- 38	30 1/8	-1 1/4	-3.9
N	RAYTHEON CO	27- 47	33 5/8	-2 5/8	-7.2
N	SPERRY RAND	30- 50	48 1/8	-1 7/8	-3.7
A	SYSTEMS ENG. LABS	7- 16	7 1/4	- 3/8	-4.9
N	VARIAN ASSOCIATES	14- 22	17 1/2	-1	-5.4
N	WANG LABS.	23- 61	27 7/8	+ 5/8	+2.2
N	XEROX CORP	121-172	145 3/8	-3 5/8	-2.4
	LEASING COMPANIES				
A	BOOTHE COMPUTER	3- 18	3 1/8	- 1/2	-13.7
O	BRESNAHAN COMP.	1- 3	1 1/2	- 1/4	-14.2
O	COMDISCO INC	3- 18	13 1/2	0	0.0
O	COMMERCE GROUP CORP	5- 11	6 1/4	0	0.0
O	COMPUTER EXCHANGE	1- 3	7/8	- 1/8	-12.5
A	COMPUTER INVSTRS GRP	7- 14	6 3/4	- 1/2	-6.8
O	COMP. INSTALLATIONS	2- 5	2	0	0.0
N	DPF INC	5- 13	5 5/8	- 1/4	-4.2
M	DATRONIC RENTAL	2- 4	2 1/8	+ 1/8	+6.2
A	DCL INC	2- 10	2 3/8	- 5/8	-20.8
A	DEARBORN-STORM	16- 26	19	-1 3/4	-8.4
A	DPA, INC.	5- 8	7	- 1/8	-1.7
A	GRANITE MGT	5- 11	5 7/8	+ 1/2	+9.3
A	GREYHOUND COMPUTER	6- 11	6	- 1/2	-7.6
A	ITEL	7- 12	10 7/8	+ 3/8	+3.5
N	LEASCO CORP	17- 24	17 1/4	-4 3/4	-21.5
O	LEASPAC CORP	6- 15	6 7/8	- 1/2	-6.7
O	LECTRO MGT INC	1- 4	2	- 3/8	-15.7
A	ROCKWOOD COMPUTER	2- 7	2 1/4	- 1/4	-10.0
O	SYSTEMS CAPITAL	3- 20	10	- 3/8	-3.6
N	U.S. LEASING	19- 33	30 1/4	0	0.0

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

TCC
Three Months Ended Sept. 30

	1972	1971
Shr Ernd	$0.1	$.01
aRevenue	1,811,000	1,649,000
Disc Op	(11,000)	40,000
Spec Item	b66,000	d12,000
Earnings	65,000	76,000
9 Mo Shr	05.	.04
aRevenue	5,374,000	4,639,000
Disc Op	49,000	81,000
Spec Cred	178,000	49,000
Earnings	321,000	209,000

a-From continuing operations. b-Credit. d-Debit.

TELEX
Three Months Ended Sept. 30

	1972	1971
Shr Ernd	$.07	$.09
Revenue	21,490,000	19,597,000
Earnings	704,000	953,000
6 Mo Shr	.14	.26
Revenue	40,944,000	44,241,000
Earnings	1,415,000	2,716,000

TEXAS INSTRUMENTS
Three Months Ended Sept. 30

	1972	1971
Shr Ernd	$1.06	$.71
Revenue	227,442,000	178,071,000
Earnings	11,725,000	7,849,000
9 Mo Shr	3.10	2.22
Revenue	679,559,000	562,087,000
Earnings	34,346,000	24,543,000

METRIDATA COMPUTING
Three Months Ended Sept. 30

	1972	1971
Shr Ernd	$.16	$.17
Revenue	1,243,000	670,000
Tax Cred	28,000	29,000
Earnings	68,000	61,000
9 Mo Shr	.60	.42
Revenue	2,992,000	1,986,000
Tax Cred	92,000	66,000
Earnings	226,000	151,000

STORAGE TECHNOLOGY
Three Months Ended Sept. 29

	1972	1971
Shr Ernd	$.35	.....
Revenue	8,392,000	$1,464,000
Tax Cred	478,000	.....
Earnings	1,228,000	(766,000)
9 Mo Shr	.66	.....
Revenue	17,972,000	1,727,000
Tax Cred	919,000	.....
Earnings	2,160,000	(3,854,000)

STERLING ELECTRONICS
Three Months Ended Sept. 30

	1972	1971
Shr Ernd	$.01	.....
Revenue	14,913,857	$14,212,592
Disc Op	a(27,186)	(167,192)
Tax Cred	16,342	32,908
Earnings	31,043	(177,340)
6 Mo Shr	.04	.....
Revenue	30,102,813	27,361,785
Disc Op	a(58,285)	(233,115)
Spec Item	b79,986	d(159,463)
Earnings	168,069	(467,558)

a-From operations to be discontinued. b-Tax credit. d-Loss from sale of land.

DATA GENERAL
Year Ended Sept. 30

	1972	a1971
Shr Ernd	$1.47	$.67
Revenue	30,324,000	15,341,000
Earnings	3,897,000	1,561,000
4 Mo Shr	.56	.29
Revenue	11,382,000	6,231,000
Earnings	1,497,000	700,000

a-Restated to reflect acquisition of Systems Equipment Corp., Atlanta, in April 1972.

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The DCT 1000 gives you communications over common carrier lines at speeds up to 4800 bits per second. A variety of configurations is possible, via point to point, multipoint or multiplexed operation on switched or private lines. That's versatility.

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Director of Marketing, Communications and Terminals Division, SPERRY UNIVAC, 322 North 22nd St., Salt Lake City, Utah 84116

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